Coal Age

SEPTEMBER, 1956

A McGRAW-HILL PUBLICATION—PRICE 50¢

High Tonnage
With Small Crews . . . . . p 60

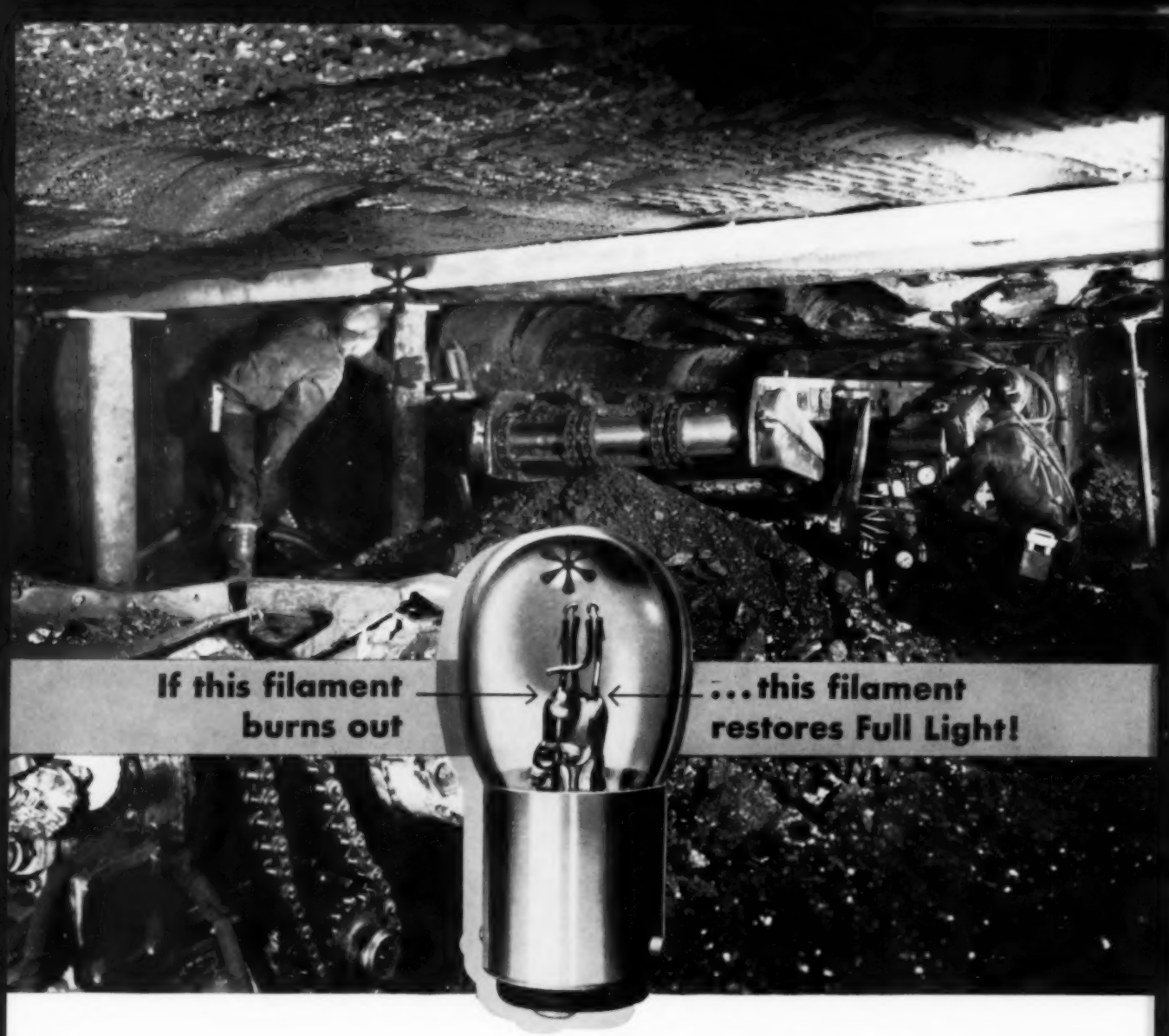
Highwall Augering
In Tight Quarters . . . . . p 72

UNITED COMMUNITY CAMPAIGNS
Give...the United way

Building for 1960

- Capital Investment
- Mine Capacity
- Output per Man

p 54



Man-hour protection for working crews . . . the Edison R-4 double-filament bulb

This working crew enjoys greater underground safety, more productive man-hours because the Edison R-4 double-filament bulb is on the job.

Miners equipped with this bulb know that burn-out doesn't mean blackout. If one filament burns out, a turn of the switch transfers the power of the unfailing Edison battery to the second filament—continued, brilliant illumination is restored for the full shift. There's no lost time for the miner, or short crews for the foreman. There is only *one bulb*, located in the center of the headpiece, which gives the advantages of maximum reflector area.

This kind of reserve light protection means that hundreds of man-hours may be saved every year. The result is increased production with an added margin of safety. Our bulletin gives complete details. Write for your copy.

Edison R-4 Cap Lamp . . . ideal for self-service systems.

MSA
SAFETY EQUIPMENT HEADQUARTERS

When you have a safety problem, M-S-A is at your service — our job is to help you

MINE SAFETY APPLIANCES COMPANY
201 North Braddock Avenue, Pittsburgh 8, Pa.
At Your Service: 77 Branch Offices in the United States and Mexico

MINE SAFETY APPLIANCES CO. OF CANADA, LTD.
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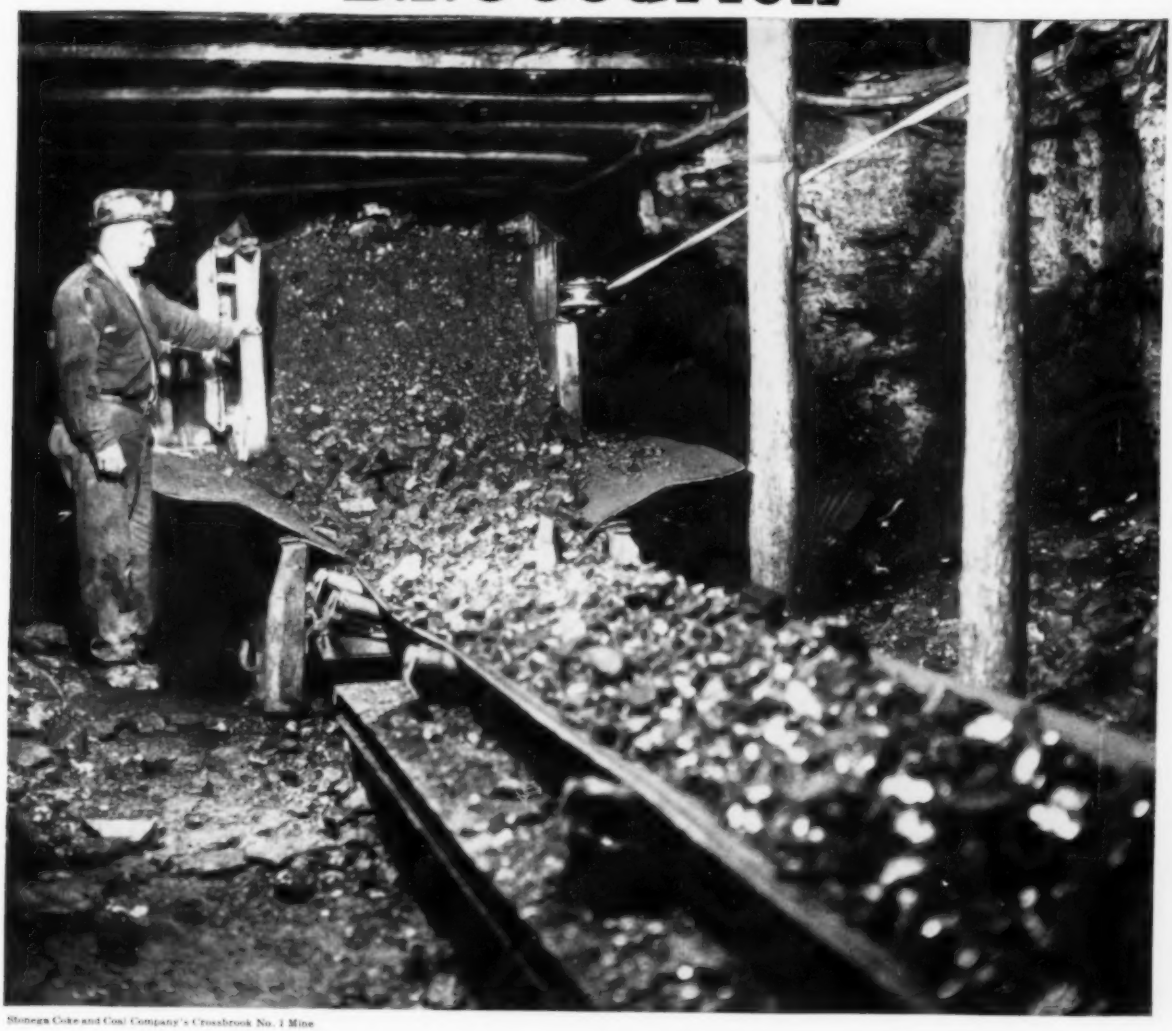
B.F.Goodrich



Stonega Coke and Coal Company's Crossbrook No. 1 Mine

B. F. Goodrich belt resists fire, will not spread flames

THREE years ago, this Virginia coal company took a major step toward increased mine safety. They ordered B. F. Goodrich conveyor belts, made with a new fire-resisting rubber.

The B. F. Goodrich fire-resisting belt will not support combustion or spread fire. While it will smolder when exposed to open flame, it stops immediately when the fire is removed. B. F. Goodrich belts have been accepted for listing as fire resistant by The Bureau of Mines (Acceptance No. 28-6).

The special rubber used in these belts also has high resistance to impact, abrasion, oil, grease, tearing, cutting, gouging, and even mildew attack. As a result, B. F. Goodrich belts made with fire-resisting rubber can be expected to equal—or surpass—the long service records made by other B. F. Goodrich Caricoal belts in underground mines.

At the mine shown in the picture, the superintendent reported that the B. F. Goodrich fire-resisting belts show little or no wear.

Let your B. F. Goodrich distributor show you how longer-lasting Caricoal conveyor belts can cut your coal-handling costs, reduce maintenance costs, and if made with fire-resisting rubber, reduce the chance of fire in your underground mines. *B. F. Goodrich Industrial Products Company, Dept. M-763, Akron 18, Ohio.*

B.F.Goodrich

INDUSTRIAL PRODUCTS

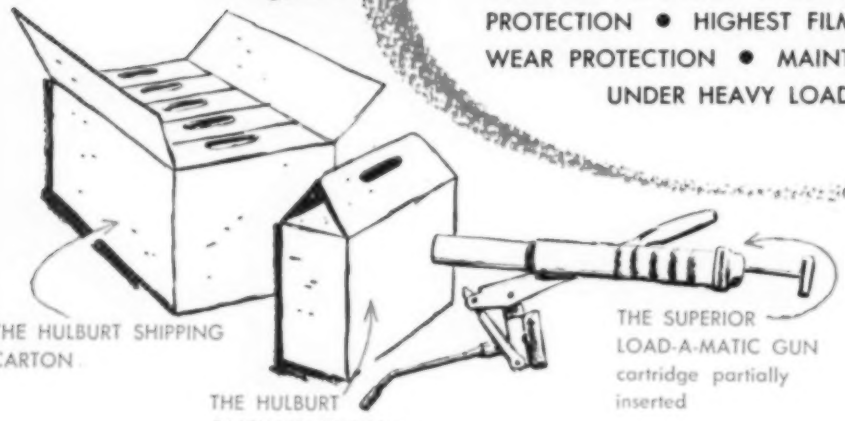
Hulburt

SOMETHING *New* HAS BEEN ADDED

A ONE POUND THROW-A-WAY GREASE CARTRIDGE

Hulburt 8AP Grease

NON-MELTING • COMPLETE WATER RESISTANCE MAXIMUM OXIDATION PROTECTION • MAXIMUM RUST PROTECTION • HIGHEST FILM STRENGTH AND ANTI-WEAR PROTECTION • MAINTAINS ITS CONSISTENCY UNDER HEAVY LOAD CONDITIONS



THE HULBURT SHIPPING CARTON

THE HULBURT CARRYING CARTON

THE SUPERIOR LOAD-A-MATIC GUN cartridge partially inserted

CARTRIDGES FILLED WITH MULTI-PURPOSE
"RED GREASE" CONTAINING DU PONT ESTERSIL GT

No Waste *No Dirt* *Time Saver*

HULBURT OIL AND GREASE COMPANY
PHILADELPHIA 34, PENNSYLVANIA

NON-STOP OPERATION . . .

LOWEST COST PER TON

when you dewater your fine coal with

BIRD COAL FILTERS

Put Bird Coal Filters on the job and you can forget about them except for routine lubrication. They'll run for months on end without overhaul or parts replacements.

What's more they'll cost you so much less to operate and maintain — around seven cents per ton or less — that they're actually cheaper in the long run than any other dewatering equipment you can buy.

Coal is discharged as dry as from any mechanical equipment and the whole job is done in a single unit. All fine coal can be recovered and high ash fines discarded as desired. Dilute feeds present no problems.

Whether your plant washes 100 tons or less per hour or 2000 tons or more the Bird Coal Filter means less trouble and lower cost. Ask us to prove it for *your* plant.

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MACHINE COMPANY

LEADING AUTHORITY ON SOLIDS-LIQUIDS SEPARATIONS
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Coal Age

SEPTEMBER • 1956

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In this issue . . .

• What is the coal industry itself doing to clinch the promising future that everyone else is talking about? To find the answers, *Coal Age* went to the industry and, based on reports representing one-third of 1956 bituminous tonnage, presents a unique roundup on p 54 on how coal plans to meet expanding demands over the next 5 yr and beyond. The roundup features strip and deep bituminous plans for capital spending, capacity increases and tons-per-man objectives. Equipment needs, supply costs and production efficiency problems are also treated. Similar data is provided on the anthracite industry.

Next month . . .

• Higher yield of metallurgical coal through improved cleaning to get lower sulfur content is the major benefit now being realized at the new preparation plant of Joanne Coal Co., near Fairmont, W. Va. A full description of the process will appear in the next issue.

• Also on the agenda are operating reports on a new tractor-mounted overburden drill and on the latest heavy-media vessel in cleaning anthracite.

In the works . . .

• A report on recent developments in air pollution control with reasons why the industry should expand its present control program. The report will discuss benefits of an expanded program and make recommendations for it implementation. Also included will be a roundup of trends in national, state and municipal legislation.

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your wire rope will stay strong longer, no matter how rugged the job it does. *Texaco Crater's* extra-tough film gives each strand sure protection against wear and rust — penetrates right through to the core, too. You're assured of dependable rope service and a real saving in maintenance costs.

Texaco Crater

also does a great job on open gears. Its protective film *stays on* gear teeth — provides smooth, quiet operation with far less wear.

If you prefer the application ease of a fluid lubricant for both wire rope and gears, use *Texaco Crater X Fluid*. It has all the protective, cost-saving properties of regular *Crater*.

For your mine car wheels, use *Texaco Olympian Grease* — the lubricant that assures quick starts, longer bearing life and lower maintenance costs.

A Texaco Lubrication Engineer can help you get more efficient, more economical performance from all your equipment. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO

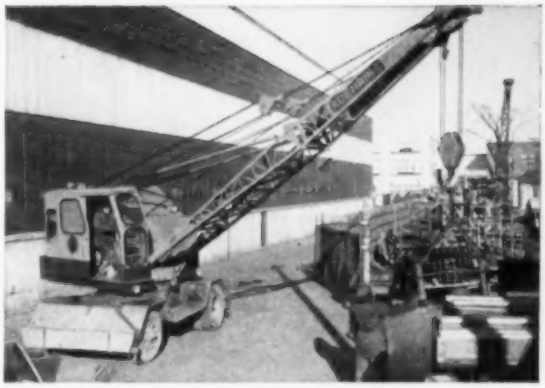
TEXACO

LUBRICANTS for the Coal Mining Industry

Quarry rock — Take another look at the heavy-duty shovel (above), loading rock at a Midwest quarry. It's the new Koehring ¾-yard 305, with 18-foot deep-section boom, and 15-foot dual dipper-sticks. In heavy digging like this, operators like the light lever-pull of its big power clutch, and accurate "feel" of load. *You'll* like its *extra work capacity* with all attachments, on crawlers or rubber (see ratings on next page).

Mining phosphate — After stripping overburden at a Southern mine (right), 605 dragline loaded phosphate out of the deep cut. It has plenty of work radius for this type of operation — can be used with 50 to 110 feet of boom, and handles 1½ to 2½ cu. yd. dragline or clamshell buckets, depending on weight of materials. Better check what this big Koehring 605 can do on your excavating, lifting and material-handling.

21.5 m.p.h. Cruiser® — One man controls all operations, one engine supplies all power for work and travel on the new Koehring 205 Cruiser Crane. There's a full range of low working speeds to 7 m.p.h. — plus travel speeds up to 21.5 m.p.h. Has smooth torque-converter drive, power-steering, climbs 30% grades. Usefulness is unlimited in mines, pits and quarries. It lifts up to 15 tons — handles ½ to ¾-yard clamshell or dragline buckets — converts to shovel or hoe. Versatile Koehring 205 also is available on truck mounting or on heavy-duty crawlers (more details below).



Stockpile specialist — Owner of this yard put stockpiling on a big-tonnage basis with a 405 clamshell crane. Its smooth swing, fast line speeds, and wide work radius pay off on all kinds of material-handling. This 405 is another in the modern, new series of Koehring excavators and cranes. Want more information? Call your Koehring distributor today.

Here are some figures that will interest you:

KOEHRING MODEL	SIZE DIPPER	LIFT CAPACITIES (Crawler ratings based on 75% of tipping load. Rubber-tired machines — 85% of tipping load.)	
205 CRAWLER	½-Yd.	20,000 lbs.	at 10-foot radius
205 ON RUBBER	½-Yd.	30,000 lbs. 13,700 lbs.	at 12-foot radius at 20-foot radius
305 CRAWLER	¾-Yd.	30,000 lbs.	at 12-foot radius
305 ON RUBBER	¾-Yd.	50,000 lbs. 15,800 lbs.	at 10-foot radius at 30-foot radius
405 CRAWLER	1-Yd.	40,000 lbs.	at 12-foot radius
605 CRAWLER	1½-Yds.	72,300 lbs.	at 12-foot radius
1205 CRAWLER	3-Yds.	190,000 lbs.	at 13-foot radius

KOEHRING COMPANY Milwaukee 16, Wis. Subsidiaries: JOHNSON PARSONS • KWIK-MIX

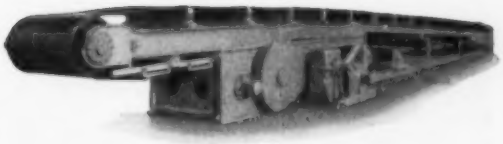
Haul **heavy** loads at

high speeds at **low** cost with

JEFFREY CLASS 66 SHUTTLE CARS

MORE round trips per shift with bigger payloads is typical of Jeffrey Class 66 Shuttle Car performance, operators find. Enthusiasm runs high, too, for this car's maneuverability. It has positive 4-wheel drive with no-slip differential between wheels on the same axle, for easier steering and handling, especially on curves. Loading and unloading are fast because the operator has the aid of the variable speed hydraulically driven discharge conveyor. The conveyor can be instantly reversed to clear jammed lumps. The 66 car is available in basic heights from 30 to 42 inches.

AND JEFFREY 80-A BELT CONVEYORS



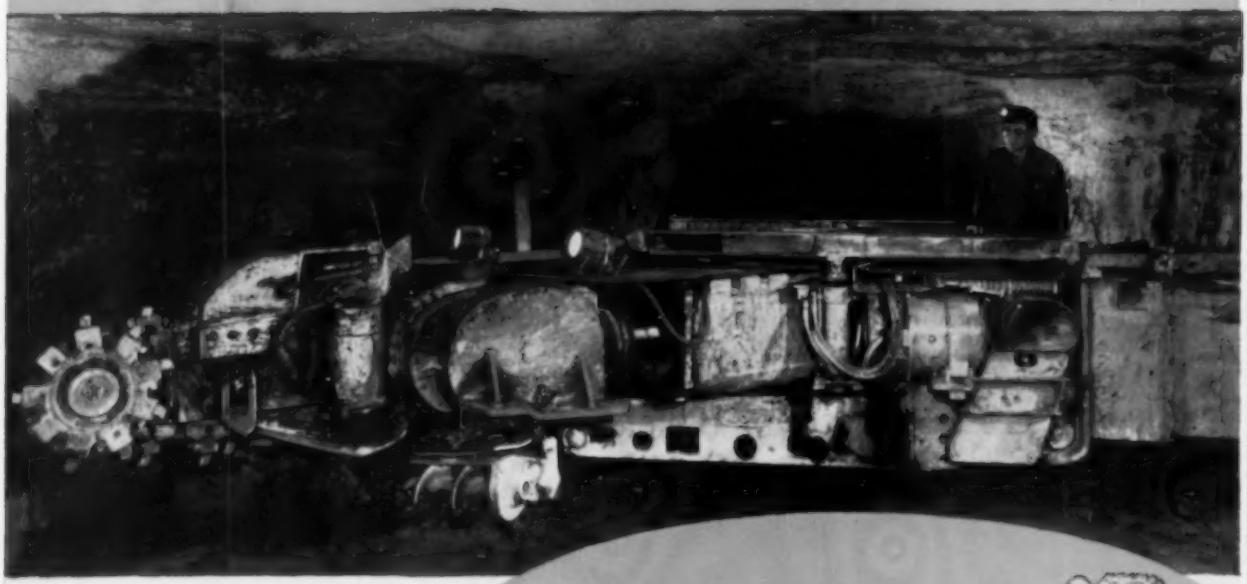
Record tonnages at the face need fast main-line haulage or production soon bogs down. Jeffrey's solution is the 80-A Belt Conveyor. The husky head section has tandem drive for maximum contact with drive pulleys and a pneumatic takeup for proper slack tension on the belt. The head is built for drives up to 160 HP and belt speeds up to 600 FPM. Sturdy frames for 30 inch or 36 inch belts complete this conveyor transportation system which can't be surpassed for high tonnages and rough-duty service.

The Jeffrey Manufacturing Company, Columbus 16, Ohio

JEFFREY

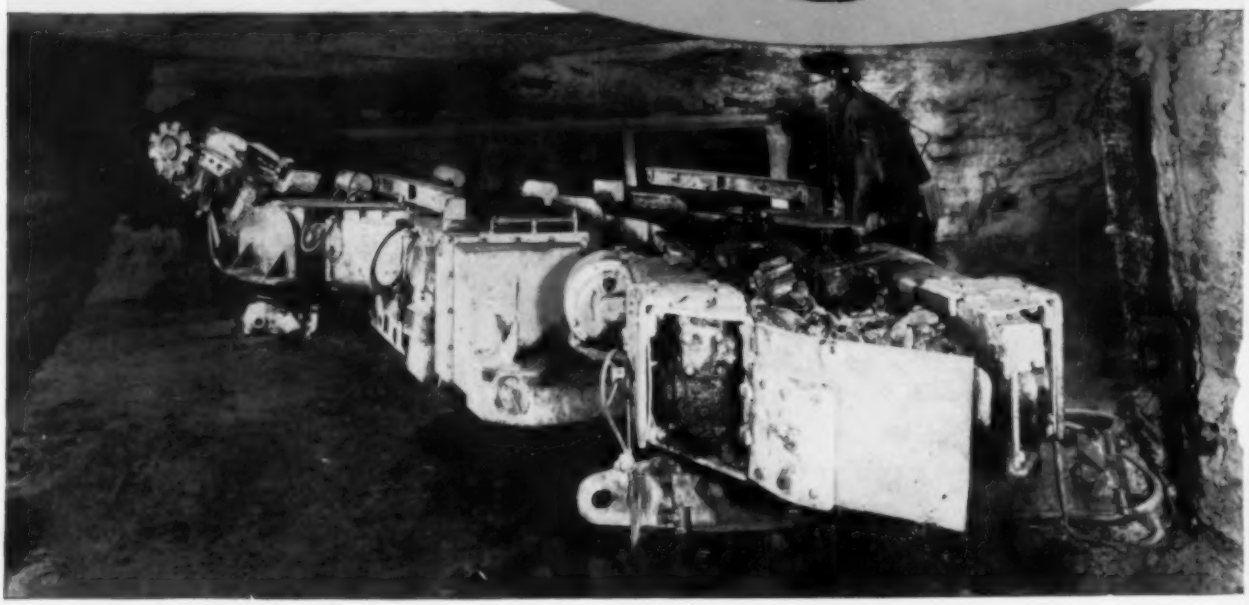
MINING • CONVEYING • PROCESSING EQUIPMENT
TRANSMISSION MACHINERY • CONTRACT MANUFACTURING

Another step forward in Continuous Mining...



In the 3 JCM-4, positive positioning of ripper bar is provided by hydraulic shear jacks, coupled through the chain for quick response. Operating controls are safely located just behind timber jacks at right rear of machine, so operator always works under timbered roof.

All piping and wiring is junctioned to provide swing clearance and easy accessibility.



HUSKIER SIMPLER MORE POWERFUL

MORE RELIABLE LESS MAINTENANCE

that's the story of the latest model

3 JCM-4 CONTINUOUS MINER

Joy research and field engineering has done it again! The 3 JCM Continuous Miner, a highly successful unit that's field-proved in mines all over the world, is now available in an improved "Mark 4" model—heavier, more rugged and foolproof, better able than ever to stay on the job and show you new cost savings and production records.

The 3 JCM-4 features a multiple-chain head with bit rings ("pineapples") on each side that cut a clearance path and relieve the load on the outside chains. Permits the use of heavier, stronger, longer-wearing chain, and an increased width of head from 30″ to 38¾″. The wider head reduces shearing time—*each cut is now 30% wider, 39″ instead of 30″.*

Ripper bar gear cases are heavier, and have bevel instead of worm gears—in fact, no worm gears are used for cutting or movement of material. These individual bevel gear drives for ripper head, front and rear conveyor reduce the friction loss of former drives and provide more actual drive power. A 5-foot ripper bar, now standard, offers more chain pitches, smoother cutting and less fly-coal than the former 4-foot bar (5½-foot bar also available). Both the front and rear conveyor drives, and the conveyor flights, have been engineered for greater strength, accessibility and reliability, and longer life.

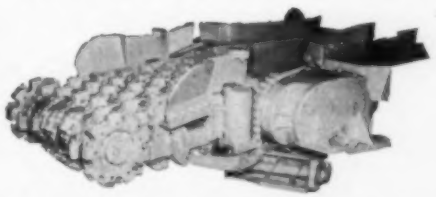
These and other features put the 3 JCM-4 away out in front in its class. The unit is 34″ high for medium seams of 40″ and higher; has 2-3 tons-a-minute capacity, depending on seam conditions; cuts vertical paths 39″ wide and 18″ deep, from 10¾″ below to 74″ above floor (93″ above with 5½″ bar); drives entries, mines rooms and extracts pillars; operates in rooms from 11′-10″ to 18′-6″ wide; turns 12-ft. crosscut 90° from 12-ft. room on a 5-ft. radius; trams 39 feet a minute; successful in coal and, with modifications, equally successful in potash, bauxite, borax and similar materials.

● Let us show you the advantages of the 3 JCM-4 and other complete Joy systems in continuous mining. ***Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.*** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

Write for FREE Bulletin 112-1

WBW 6186-112

CONVERSION UNITS AVAILABLE
for older model 3-JCM Machines



With a conversion unit, supplied as a complete factory-built assembly, earlier 3 JCM models can be improved and their capacity increased. Installed simply by removing the old unit, sliding in the new, and making the necessary connections.

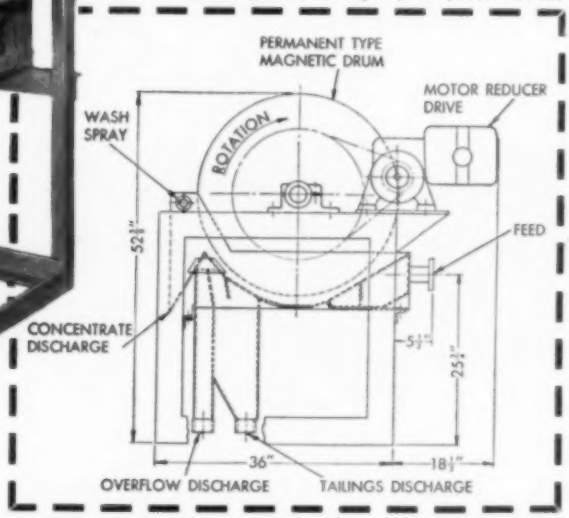
A complete conversion unit consists of a new G6111 5-chain assembly with bit rings and sideboards, mechanically driven clean-up, bevel gears for both the heavy-duty ripper bar gear cases and the front conveyor drive, redesigned shear jacks and linkage, all assembled on the new sumping frame. • Check with your nearest Joy district office.

Consult a Joy Engineer

JOY

WORLD'S LARGEST MANUFACTURER OF UNDERGROUND MINING EQUIPMENT

See this unit at Mining Show, Los Angeles, Calif., Booth No. 131.



STEARNS ANNOUNCES

new wet-drum magnetic separator for heavy media plants

Here is the Stearns type WPD Model M magnetic separator — a powerful, new wet-drum permanent magnet unit designed for efficient recovery of media in heavy density plants.

Specially-designed magnet not only has a deep, powerful field, but also provides correct flux distribution for positive transport of the collected magnetics to the discharge point. Both of these factors mean highly efficient magnetic recovery for the type WPD separator.

Designed to give you high recovery of magnetic media at low cost

Low Operating Cost — Powerful Alnico permanent magnet requires no external energization — eliminates cost of rectifier or motor generator set.

Power requirements for driving drum are low because drum turns on anti-friction bearings — yet plenty of power is available when heavy load occurs.

Non-magnetic drive components do not attract magnetic particles, thus reducing wear on chains and sprockets.

Steady Material Flow — Minimum Drum Wear — Separator tank and feeder is designed to distribute feed uniformly across the entire drum width at a point where maximum media recovery is assured. Concurrent feed keeps wear and abrasion on cylinder to a minimum and improves purity of magnetic concentrate.

Concurrent Feed Eliminates Wipers and Wash Spray — Feed flows in same direction as drum rotation, so any carry-over on drum is re-introduced to magnetic field. Wash sprays or wipers are optional if diluted concentrate is desired.

Utmost Simplicity in Operation and Maintenance — One man can control a number of units. Separator is easy to assemble and disassemble, requires a minimum of floor space.

High Gravity Concentrate — Magnet assembly squeezes out excess water and discharges concentrate with a solids content in excess of 60 percent in most installations.

Write for complete details on this new efficient type WPD heavy media separator.

1151

STEARNS MAGNETIC PRODUCTS

A DIVISION OF THE INDIANA STEEL PRODUCTS COMPANY • VALPARAISO, INDIANA

661 South 28th Street • Milwaukee 46, Wisconsin

Owners everywhere report:

"4-in-1 Skid-Shovel beats a fleet

of limited-duty rigs...outearns 'em all!"

"Clamshell cuts out hand labor"—Boh Brothers Construction Co., New Orleans, La. "If ever one machine could 'do it all,' our International Drott TD-9 Four-In-One Skid-Shovel is it," states Sam Venus, for Boh Brothers Construction Co., New Orleans, La. "Its clamshell action, for example, cuts out hand labor. We produce 150-175 5-yd. truck loads per 9 hrs." Watch the clam "surround" loose stuff—heap itself in one fast gulp!

"Loads 'high ones' others can't"—Mike Ferrantino, Dearborn, Mich. Mike Ferrantino, Dearborn, Mich., using his TD-9 Four-In-One, averaged loading 26 5-yd. trucks per hr., on a housing project. "I can load 'em from any angle, high tandems and all, with the high-reaching, bottom-dumping clamshell," he says. "My Four-In-One does so many jobs others can't do—even cleans itself of damp clay, dumping as a clamshell."

"Moves material where others quit"—Consolidated Construction Co., Bayside, Va. "Our International-Drott TD-9 Four-In-One will move material where other units quit," declares Consolidated Construction Co., Bayside, Va. "It's a multi-purpose rig, has high reach, and will out-load anything in its size class." Here they're getting accurate "carry-type scraper" action on a housing project, with Four-In-One in Bullclam position!

"Beats the others in job variety"—Leon Sumler, Memphis, Tenn. "With it, I can do a far wider variety of jobs than the others," reports Leon Sumler, Memphis, Tenn.—of his International-Drott TD-9 Four-In-One, shown tearing up old filling station slab and footings to load out. "The clamshell speeds the job," he adds, "and Drott bucket roll-back makes it possible to keep heaped loads. It's the one-tractor-man's ideal rig."

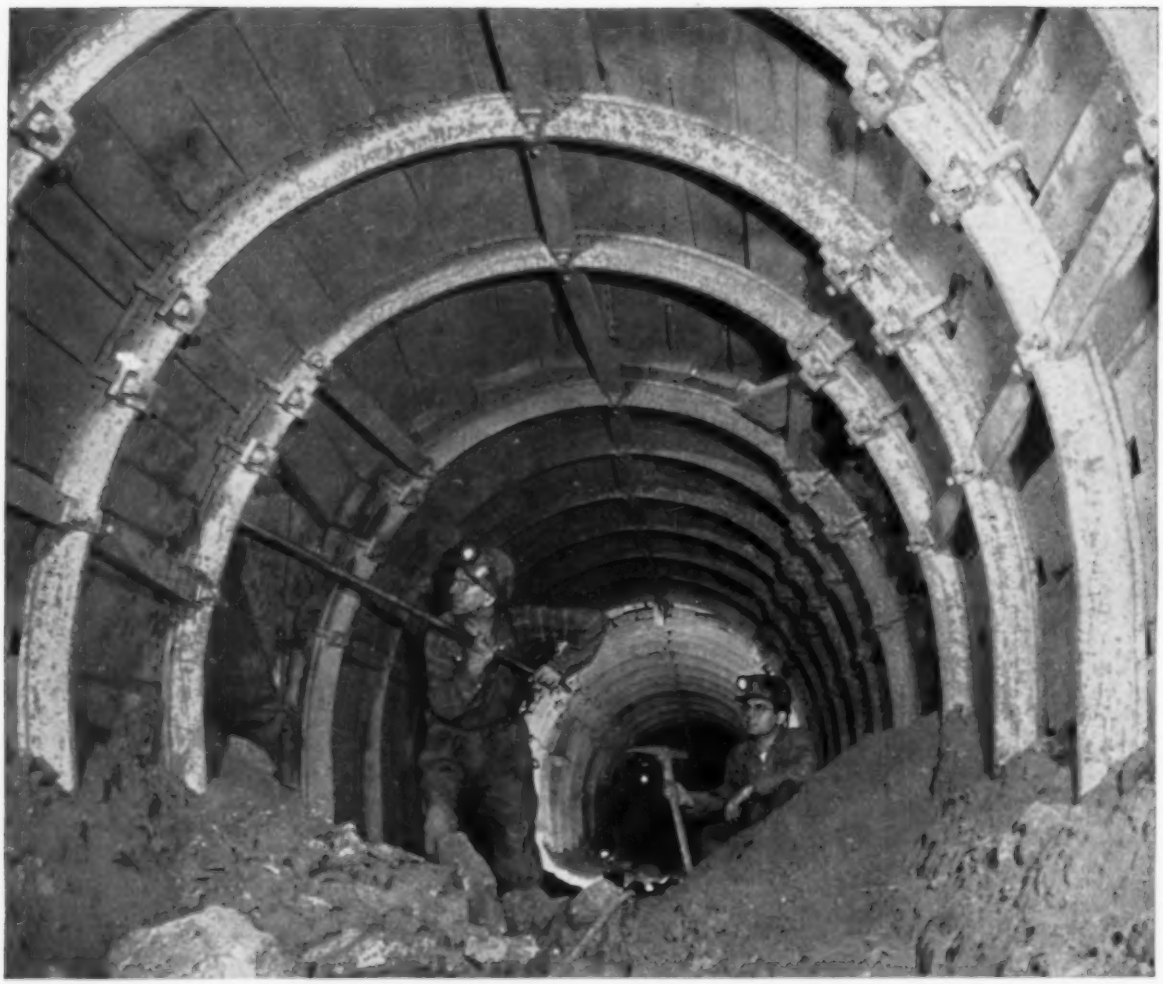
Prove versatility, unlimited—with the International-Drott 4-in-1 as Skid-Shovel, clamshell, Bullclam, and bulldozer. **Prove you get 4 big-capacity material-moving rigs in one sensibly-priced unit!"** Try other Drott exclusives, like pry-action break-out and shock-swallowing Hydro-Spring. Ask your International Drott distributor for a 4-in-1 demonstration!

International Harvester Company, Chicago 1, Illinois
Drott Manufacturing Corp., Milwaukee 15, Wis.

INTERNATIONAL HARVESTER

INTERNATIONAL®
DROTT®

See you at the ROAD SHOW
CHICAGO
Jan. 28-Feb. 2, 1957



Why a yielding arch is superior to rigid roof support

In moving ground, no rigid support, however big or of whatever material, can indefinitely withstand the dynamic pressures caused by the weight and subsidence of overburden. In fact, the more rigid the support the more it may aggravate the condition. That's because a rigid support does not distribute the loads uniformly, thus preventing a pressure zone from forming around the mine opening.

But an arch that will yield, such as the Bethlehem Yieldable Arch, allows the overburden to settle slowly forming its own natural arch, which in turn carries the major portion of the load. As the Bethlehem Arch yields, the stress is absorbed by the rock itself until equilibrium is reached.

Thus it is not the strength alone but the "give" of the Yieldable Arch that holds a tunnel or drift open. This yieldable feature comes from nesting the segments of an arch set one into the other so that they overlap. The U-bolt clamps that hold the overlapping segments together are drawn tight enough to create the right amount of friction. When the load becomes excessive it overcomes the friction sufficiently to make the segments slide, equalizing the pressure.

Each arch set is tied to its neighbor by horizontal steel struts attached with J-bolts to maintain proper spacing and lateral stability. Two spacer lugs are welded to the flanges at each joint to keep the U-clamps correctly spaced and provide more uniform frictional resistance. A Bethlehem engineer will be glad to consult with you on the application of Yieldable Arches to your mine. You can reach him through any Bethlehem sales office.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

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Export Distributor: Bethlehem Steel Export Corporation.

BETHLEHEM STEEL

BETHLEHEM STEEL

Wire Sculpture by Henry Szeferz

The Right Pick is important. That applies to choice of trailing cords and cables, too. Be guided by the fact that veteran mine-men prefer TIREX. This expertly engineered cable, newly improved for greater flexibility, has cured-in-lead Neoprene Armor that resists abrasion, oil, heat and water . . . gives maximum wear.

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79 Sidney Street,
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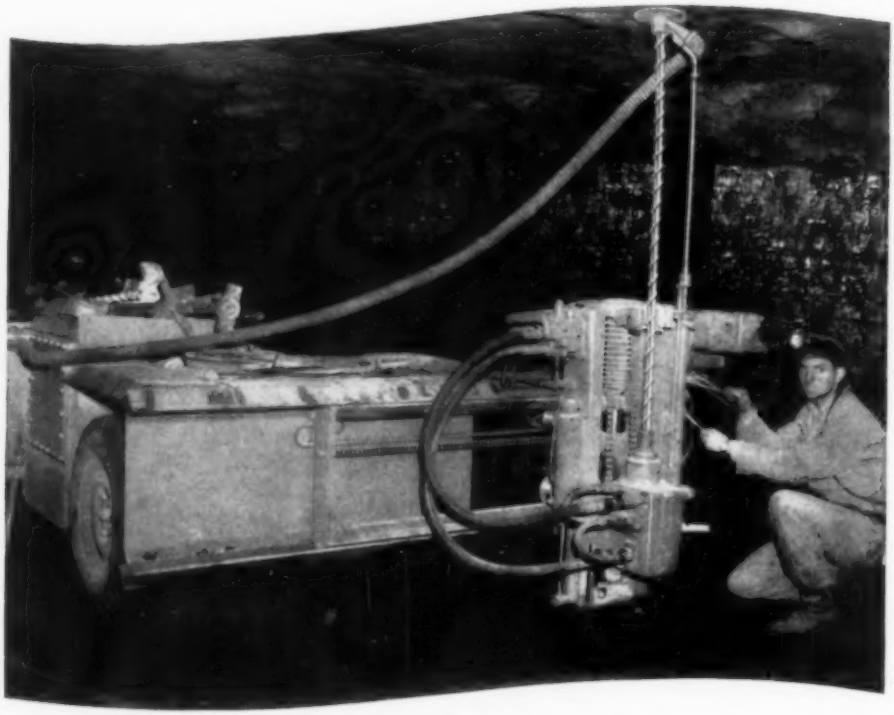
Visit us at BOOTH 1048
Mining Congress Show

LIVE BETTER ELECTRICALLY

Simplex—TIREX

THRUST IS A MUST!



. . . and FLETCHER Roof Control Drills deliver nearly TWICE AS MUCH THRUST!

FLETCHER ROOF CONTROL DRILLS have far more thrust to easily penetrate hard roof materials, *because they actually drill from the mine floor.*

An exclusive hydraulic lowering method sets the entire front-end-feed down before drilling starts — in center position or when extended out by hydro-slide. The jack-feed system used is the simplest, most effective means of providing the power, critical thrust control, and rigidity essential for maximum bit life and penetration rate.

If your roof drilling problem is high bit cost, tough materials, or slow bolt installation rate, you'll want to learn more about the Fletcher Roof Control Drills.

FEATURES

- Jack-feed system delivers maximum smooth thrust with quick raise and return.
- Hydraulic lowering device lets you drill directly from the mine floor.
- Hydro-slide moves your drill across the place smoothly, accurately and fast.
- Compact frame and third-wheel steer makes tramming quick and easy.
- Height range from 28-inches to 14-feet lets you select a drill to exactly fit your mine.
- Telescoping mast gives full stroke in varying seam conditions. And the new floor-to-floor mast gives added safety, speed and power.

Fletcher
ROOF CONTROL DRILLS

J. H. FLETCHER & CO. | P. O. Box 353, HUNTINGTON 8, WEST VIRGINIA
Phone 44186

21404

PATENTED & PATENTS PENDING

Loading in low coal can be profitable with the **GOODMAN 965** *on the job*

IT'S LOW Overall height is only 26½", coal line height 17½".

IT HAS CAPACITY Up to 10 tpm in free coal. With gathering arm reach, cleanup width is 7'1".

IT'S FAST 54 strokes per minute of gathering arms load coal onto conveyor in continuous flow.

IT HAS POWER Two 20 hp motors drive gathering arms and conveyor chain; two 15 hp motors for tramming and hydraulic pumps.

IT'S ADAPTABLE Discharge end swings 45° to either side, can be raised or lowered. Loading head has vertical movement range from 12" above bottom to 10" below.

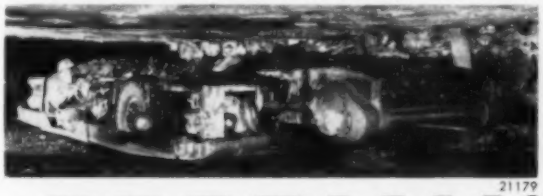
IT'S EASY TO OPERATE Finger tip action of hydraulic control levers results in smooth, positive machine movements.

IT'S STURDY Simple design with minimum of moving parts built for strength and long life. Accessibility of units for routine maintenance is a feature.

Wrap all these features into one package and you get a loader that will give you fast, steady production in low coal. Let us arrange a mine visit for you to see the 965 in action. It's convincing proof of profitable performance. Available for higher coal, the 966. Ask for details.

21411

A smooth working Goodman pair to complement the 965 loader—the Type 2400 for fast cutting, the Type 870 for quick trip transfer of loads.



21179

GOODMAN

MANUFACTURING COMPANY

Halsted Street and 48th Place, Chicago 9, Illinois

CUTTING MACHINES • CONVEYORS • LOADERS
SHUTTLE CARS • LOCOMOTIVES • CONTINUOUS MINERS

Use Genuine Goodman Replacement Parts

Low-cost Du Pont NITRAMITE® provides high-strength action in W. Virginia stripping

MS "PRIMACORD" CONNECTORS CONTROL THROW, REDUCE BACKBREAK, MINIMIZE VIBRATION

1 **VIEW** of a side hill at the Marfork, West Virginia, coal stripping of the Truax-Traer Coal Company. Bank is largely sandstone and averages 75 feet in height.

2 **BLASTERS** lower high-strength "Nitramite" (7" x 37 lbs.) into vertical holes. Du Pont MS Connectors are used to delay the holes in the shot.

3 **EXCELLENT FRAGMENTATION** and minimized backbreak are the result of combining "Nitramite" and Du Pont MS Connectors. Through use of these connectors, well-broken overburden is thrown in a limited area where shovels can remove it quickly and easily.

Safer blasting is another reason why "Nitramite" is favored in strippings. Friction, shock, rifle bullets won't cause explosion. "Nitramite" is detonated by a special insensitive primer, which must be initiated with "Primacord." And use of MS Connectors keeps caps off job until firing time! Easily handled "Nitramite" container is water-resistant . . . can be loaded many hours before shooting. E. I. du Pont de Nemours & Co. (Inc.), Explosives Dept., Wilmington 98, Delaware.

DU PONT
BLASTING AGENTS
Products of Du Pont Explosives Research

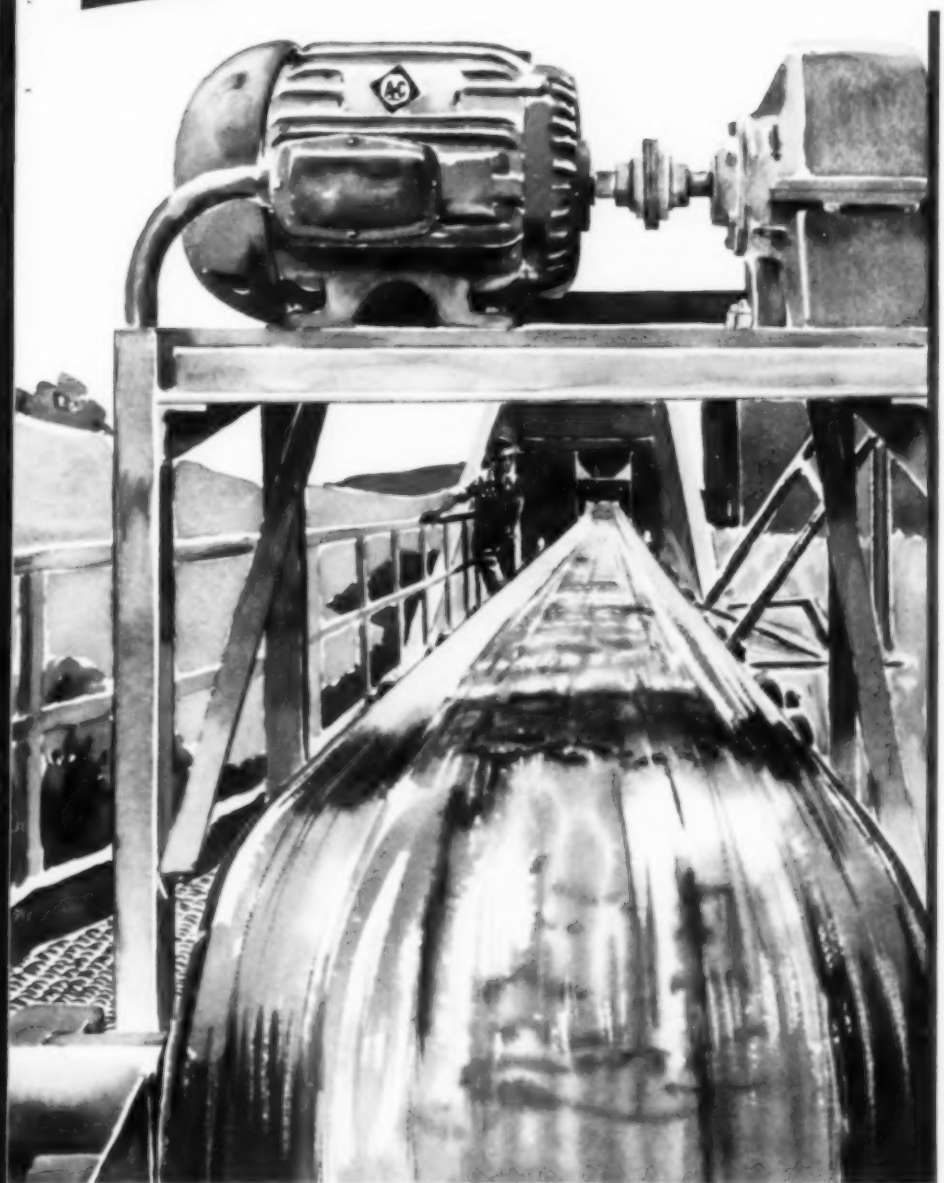
DU PONT
REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

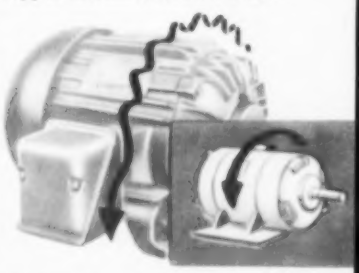
There's MORE

'Round-the-Calendar Operation

with Allis-Chalmers MOTORS



MORE IRON AND COPPER provide double protection against costly breakdowns. Liberal use of cast iron protects against frame distortion, and greater amount of copper increases electrical life.



MORE COOLING SURFACE of Allis-Chalmers deep-rib motors makes insulation burnouts highly improbable under normal conditions. There are no external enclosed air passages to become clogged.

A NATIONAL NETWORK of Allis-Chalmers Motor Distributors is on the job day and night... ready to provide the fast service needed to keep your plant operating 'round-the-calendar.

As a new machinery component or as replacement, specify Allis-Chalmers motors. To find out more, contact your nearby Allis-Chalmers district office, your A-C distributor, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

A-C ALLIS-CHALMERS

A-4906

There's an Allis-Chalmers VIBRATING SCREEN for EVERY Coal Application

For complete information, see your A-C representative or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wis.

Run-of-Mine SCALPING

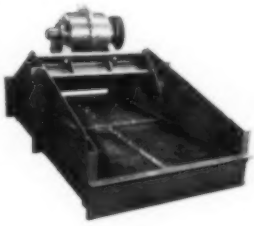
A heavily constructed, two-bearing inclined screen for scalping ahead of picking tables or crushers. Floor mounted or suspended. Sizes 4 x 10 to 6 x 16 feet, Model XH, *Ripl-Flo* screen.

SIZING TO EGG, NUT, STOKER GRADES

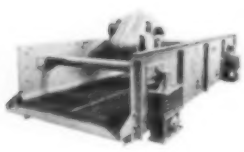
An inclined screen used for wet or dry screening of raw coal ahead of washers . . . for preparing egg, nut, stoker sizes . . . for grading and re-screening crushed coal. Sizes 3 x 6 to 6 x 16 feet, Models S or SH *Ripl-Flo* screen. Send for Bulletin 07B6151D.

DEWATERING — SLUDGE RECOVERY — FILTERING

Operates horizontally for maximum effectiveness in primary and secondary dewatering, desliming and recovery of solids to prevent stream pollution. Sizes 3 x 6 to 6 x 16 feet, *Low-Head* screen. Send for Bulletin 07B6330A.



Allis-Chalmers Builds MORE Coal Industry Screens than any other Manufacturer

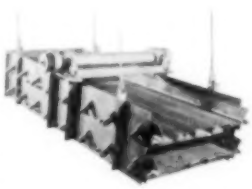


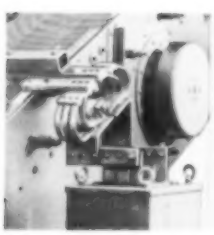
MEDIA RECOVERY

Used for media draining and the washing of coal and refuse, this horizontal screen is available with movable partitions to facilitate handling of both products. Sizes 3 x 6 to 6 x 16 feet, *Low-Head* screen.

AUXILIARY SIZING AND DEWATERING

This modern screen is particularly applicable for sizing coal or middlings following air cleaner, sludge dewatering and dewatering after chloride washer. Sizes 3 x 6 to 4 x 10 feet Model AVS, *Aero-Vibe* screen. Bulletin 07B6099.





SIZING FINE, MOIST COAL — *Thermo-Deck* Heating Unit and *Sta-Kleen* Deck

Low voltage resistance heating of wire cloth eliminates troublesome blinding and increases screen surface life. No downtime to clean screen. Unit can be installed on Allis-Chalmers screens now in use. Send for Bulletin 07B7812.

The *Sta-Kleen* deck, with bouncing balls between cloth and retaining deck, when used with the *Thermo-Deck* unit prevents fine material from baking on screen during interruptions in feed. Send for SN-55.

Thermo-Deck, Sta-Kleen, Ripl-Flo, Low-Head and Aero-Vibe are Allis-Chalmers trademarks.

ALLIS-CHALMERS

A-5012

Now... world's **MOST POWERFUL and FASTEST push tractor...**

with 416 HP and 4-wheel drive

The Twin-C Pusher

...to give you bigger loads in shorter loading time

One operator and this powerful "Twin-C" pushes your biggest production scrapers for capacity yardage. On many jobs it will do this in less time than it takes 2 crawler-pushers with 2 operators. Rubber-tired speed, and articulated steer, give quick maneuverability for direct-line push, save seconds in picking up next load.

Synchronized power matches speeds of earthmovers — Twin-C speeds match loading speeds of modern rubber-tired earthmovers, take advantage of combined power of loader and pusher to get big pay loads *fast*. Torque converter, teamed with constant-mesh transmission in both front and rear engines, reduce "lug downs" and gear changes necessary in many pushers.

More usable power with rubber pushing rubber — You get greater usable horsepower and coordinated pushing force when you push rubber with rubber. You get full floating traction... tire treads follow tire treads... no loss of power to flatten out rounded tire-tracks into flat track-tracks. And Twin-C's 80,000 lbs. weight rides on four big 29.5 x 29 tires with 22-ply rating; each 2'5" wide for firm ground-gripping traction on any type of surface.

Additional Twin-C advantages:

- Forward speeds to 20 mph and fast reverse, plus "articulated" steer, enable Twin C to position faster behind scrapers.
- Big 49½ x 88" heavy, concave push-bowl is positioned by an electric motor to take full advantage of contact area provided by scraper push-block.
- Push-button electric controls with instant response, the same type controls used on LeTourneau-Westinghouse scrapers for 8 years, give you positive power-steer and accurate push-plate-positioning.
- Power-transfer differentials on both engines match pull to traction, automatically apply power to wheels on firmest footing. Keep big pay-loads rolling in soft footing on all stripping and pit operations.

If your fleet includes production scrapers, you will want more information on the Twin-C Pusher. Ask your LeTourneau-Westinghouse Distributor for full details.

65,900 lbs. Drawbar Pull! Powerful 416 hp Twin-C Pusher push-loads scraper fast. In recent Dynamometer tests, Twin-C, operating in sandy clay footing, registered drawbar pull of 65,900 lbs. in low-speed range.

Twin-C—Trademark TW-1039-M-b

LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

ARBA See you at the ROAD SHOW • Chicago • January 28-February 2, 1957

STOP VARNISH!

Refill now with Sinclair SUPER TENOL® Motor Oil for top protection against harmful varnish in your Diesel engines.

No matter how rushed the job, SUPER TENOL protects your engine against the effects of high temperature, over-loading and *continuous stop-and-go*. Your Diesel stays on-the-job longer, with less wear . . . fewer repairs.

You get these benefits from Sinclair SUPER TENOL because it's specially made for *severe duty*. High viscosity index base oils, plus a heavy concentration of selected additives, have been combined to give you maximum protection against varnish, sludge, rust, and acid corrosion.

Refill now with Sinclair SUPER TENOL. Contact your local Sinclair Representative for further information or write Sinclair Refining Company, Technical Service Division, 600 Fifth Avenue, New York 20, N. Y. *There's no obligation*

SINCLAIR SUPER TENOL

Why the Big "B" Rear-Dump

can cut your hauling costs

Speeds to 34 mph

The new 35-ton capacity B Tournapull Rear-Dump has 10 forward speeds, from 2 mph to 34 mph . . . 2 reverse speeds, 2 and 4 mph. Rapid shift and quick acceleration of 293 hp diesel engine lets you move faster and easier into higher gear ranges.

Improved gradability

Proper distribution of weight forward onto drive wheels allows "B" to go up steep grades.

Fast loading

Large "target" area makes loading fast and simple. Bowl is 17′8″ long, 10′2″ wide, has maximum depth of 7′6″. Rear of body provides wide, low entry which gives excavator faster loadings.

Fingertip control of dumping

The touch of a switch, activates hoist motor to lift body. As body lifts quickly, it swings behind rear wheels to dump clean. Completely streamlined bowl sheds material readily. There is positive control both up and down.

Rugged Construction

Body is heavy steel plate, rigidly reinforced. Three layer bottom consists of heavy bottom plate, thick steel billets and heat treated steel strips to resist wear. Main case of prime-mover is built extra strong . . . will not distort to put strain on power-train.

No hydraulics, springs or hinged steering connections

Problems of conventional rear-dumps are eliminated by simple design of "B" Rear-Dump. Troublesome hydraulics, long driveshafts, springs, spring hangers and hinged steering connections are eliminated. Improved hauler means higher mechanical efficiency and lower maintenance costs on all hauling jobs.

Ask for complete information on how this unit can be interchanged with a Scraper or Crane, at about 25% of original total price.

Now available with optional tailgate.

Tournapull—Trademark Reg. U.S. Pat. Off. BR-889-G-4

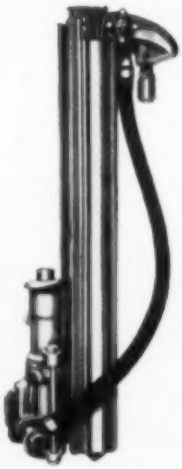
LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

ARBA See you at the ROAD SHOW • Chicago • January 28-February 2, 1957

28" FEED

46" FEED



64" FEED

Remove Snap Ring

Remove Chuck

THE LE ROI-CLEVELAND S20 VAC-NU-MATIC STOPER

All models available in either SAV-A-CHANGE or Socket Type Chuck

● The new CLEVELAND S20 VAC-NU-MATIC dust collecting stoper is available in 3 feed lengths to suit any working height down to a 26" seam. *It will produce a 30" hole in a 26" seam without using coupled steel.* The 28" feed weighs 69 lbs. complete. Any model may be used either hand held or jumbo mounted. VAC-NU-MATIC bits are fast and free cutting and eliminate all stuck steels. Dust collection is positive even in wet top. Chucks may be replaced without dismantling the machine, using only a pair of snap-ring pliers. Cuttings are removed at the chuck housing and do not pass through the machine. Write for bulletin RD32 or let us demonstrate in your own mine.

For sales, service, information or demonstration in Pennsylvania and West Virginia contact: Schroeder Brothers — 3116 Penn Ave., Pittsburgh, Pa. or Acme Machinery Co. — Williamson, W. Va. In the Birmingham district contact Equipment Service Co., 617 North 9th St., Birmingham, Ala., or contact us direct from anywhere.

LE ROI *Division of Westinghouse Air Brake Co.*

Milwaukee 1, Wisconsin

Manufacturers of Cleveland Air Tools

PORTABLE AIR COMPRESSORS · TRACTAIR · STATIONARY AIR COMPRESSORS · AIR TOOLS · ENGINES

RD-75

This Bucyrus-Erie 1050-B stripping shovel is stripping overburden in an Ohio mine.

Familiar answer to an old problem...

As overburden goes deeper and deeper, the need becomes greater and greater for stripping methods that will hold costs down to reasonable levels. An effective and familiar answer to the problem is a Bucyrus-Erie stripping shovel such as this 1050-B.

These machines are capable of moving really big yardages at low cost per yard. They have the long working range and time-saving maneuverability to work effectively. Just as important, the simple, field-proved design helps keep operating expense and maintenance to a minimum.

If you're looking for a solution to the problem of rising stripping costs, check into the economical advantages that Bucyrus-Erie stripping shovels and draglines can bring you. Bucyrus-Erie builds these machines in capacities up to 65 cu. yd.

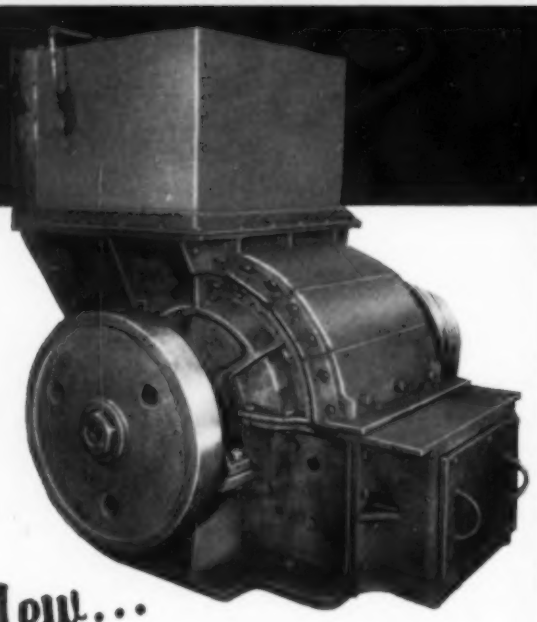
79L56C

BUCYRUS ERIE

SOUTH MILWAUKEE
WISCONSIN

ELIMINATE *the Labor Costs of Pickers...*

RECOVER... *More Coal*



New...

AMERICAN HEAVY DUTY "S" CRUSHER

- **Pays for Itself in Months**
- **Adds More Profits for Years**

A dozen installations of the new Heavy Duty "S" Crusher prove that it cuts labor costs by eliminating men at the picking tables.

It also offers important savings in recovered coal—coal that was formerly thrown away because of imbedded impurities. It is now crushed and washed for reclamation.

The Heavy Duty "S" is powerful enough to reduce ROM coal 42" x 36" x 30", as well as rock, slate, sulphur balls and gob, without oversize.

By cutting labor costs, by adding to your output, the new Crusher pays for itself in less than a year. From then on it's clear profit.

Let American show you now how the Heavy Duty "S" Crusher can up your profits, down your operating costs. Your inquiry is welcomed.

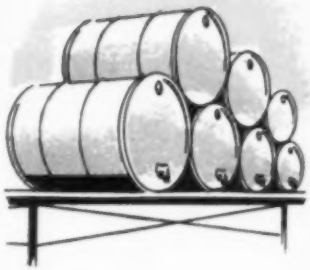
American
PULVERIZER COMPANY

Originators and Manufacturers of Ring Crushers and Pulverizers

1119 Macklind Ave., Saint Louis 10, Mo.

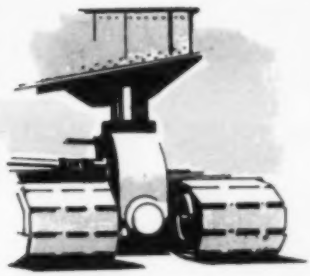
How to cut mining maintenance costs

Use STANOIL Industrial Oil—save these three ways



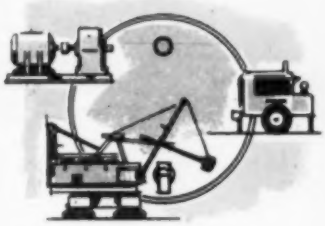
1 **Reduce oil inventories**

STANOIL Industrial Oil can be used in so many places that you can reduce inventories of special oils. Add to this the economy of simplified storage and handling. Use STANOIL Industrial Oil in electric motors, air compressors, fans, blowers, transmission and clutch lubrication, and hydraulic systems. Use STANOIL to lubricate bearings either in direct application or in oil circulating systems.



2 **Get better lubrication**

Special solvent-refining techniques plus the blending in of exclusive additives make STANOIL the finest industrial oil. STANOIL resists chemical change . . . lubricates effectively and completely over a wide temperature range . . . cuts wear. It protects oil systems from troubles due to carbon deposits, corrosion and emulsion. It stands up under heavy and repeated shock loads. STANOIL has high oxidation stability and extremely low carbon forming tendency.



3 **Prevent application mistakes**

When there is only one lubricant, there can't be any chance of the wrong one being used. With STANOIL, errors in application that would result in breakdowns are eliminated; equipment stays in service longer; maintenance is easier; overhauls go more smoothly and equipment is back in service faster.

Get more information about STANOIL Industrial Oil. Call your Standard Oil industrial lubrication specialist. He is experienced in mine lubrication. There is one near you in any of the 15 Midwest and Rocky Mountain states. Or write, Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

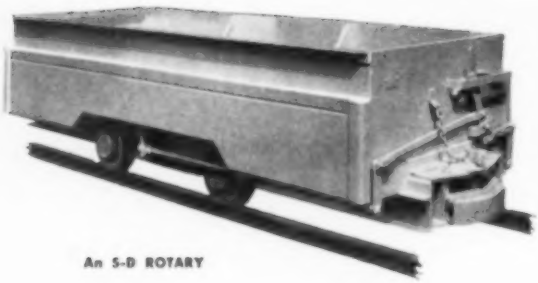
STANDARD

STANDARD OIL COMPANY
(Indiana)

Quick Facts About

STANOIL Industrial Oil

- **Stability**—STANOIL's antioxidant gives oil resistance to chemical change, minimizes deposits.
- **Rust Prevention**—The inhibitor in STANOIL "plates out" on metal surfaces, prevents corrosion.
- **Cold Starts**—STANOIL has low pour point. Flows freely from cold start. No need for costly warm-ups.
- **Resists Effects of Temperature Change**—STANOIL has high viscosity index, resists temperature change.
- **Has Excellent Demulsibility**—STANOIL is refined to eliminate emulsion problems, contains additive to minimize foaming.



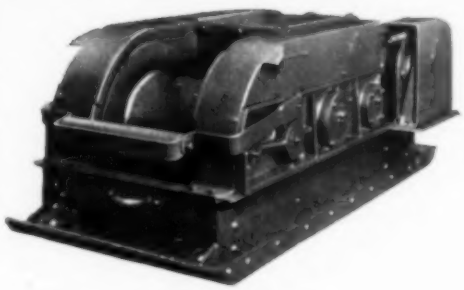
An S-D ROTARY

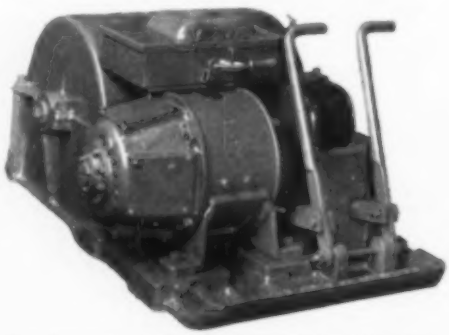
The new S-D BRAKEMAN CAR that eliminates skids and additional locomotives for braking trips.

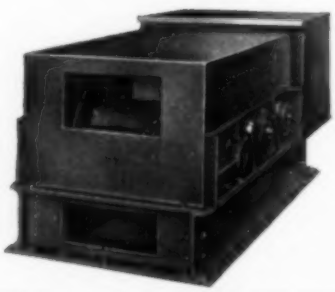
Sanford-Day... Super

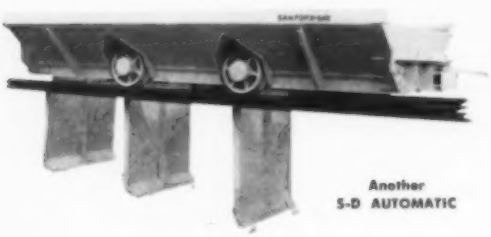
Headquarters for the BROWNIE LINE of Hoists— proved in scores of mines!

Our Brownie Line helps you select the right hoist to meet your requirements. It's the industry's most complete line—rigging hoists, room hoists, haulage hoists, car-spotting hoists, layer loading hoists—hoists for every haulage use. Be sure you obtain the right hoist to meet your requirements. Investigate the Brownie Line. Also investigate our Oil Spray Outfits, Gathering Pumps and Pump Accessories, Blowers, Brownie Rerailers and Derailers. BROWN-FAYRO DIVISION, Sanford-Day Iron Works, Telephone 3-4191, Write P. O. Box 1511, Knoxville, Tenn.

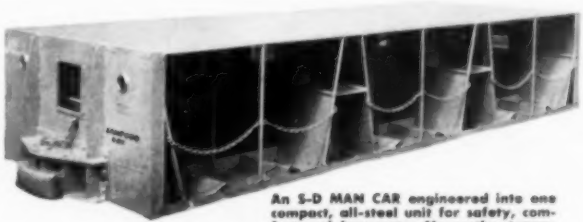




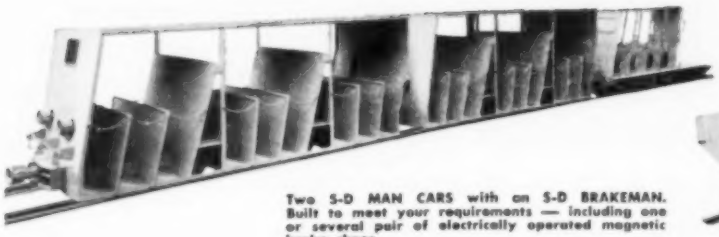




Another S-D AUTOMATIC

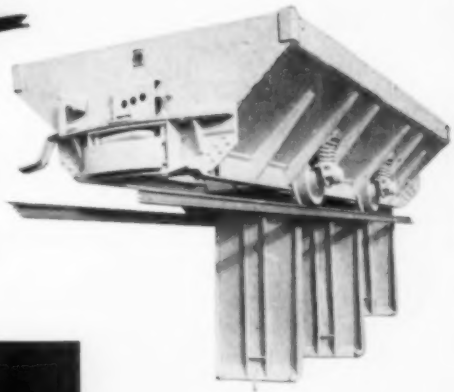


An S-D MAN CAR engineered into one compact, all-steel unit for safety, comfort and low cost. No costly streamlined construction. Safety at low cost was the important factor in this car — the best possible buy for safe and efficient personnel transportation.



Two S-D MAN CARS with an S-D BRAKEMAN. Built to meet your requirements — including one or several pair of electrically operated magnetic brake shoes.

A big capacity 4-wheel S-D AUTOMATIC is shown at right. Designed and built for extra years of service — ½" plate in the doors, for instance. Level full capacity 277 cu. ft. Surcharge capacity 338 cu. ft. Might be the car you need.



Market for mine cars

Below is another big capacity 4-wheel S-D AUTOMATIC. Negotiates 50 foot minimum radius curve when coupled. Note overlapping ends, permitting continuous belt loading without spillage between cars.

IS THERE SOMETHING special you need in mine cars—a feature to meet your particular requirements? You probably will find the answer in our plant. Down through more than 50 years of car building experience we have solved the major problems of mine haulage.

Regardless of the type car you need, we build it . . . cars so constructed to give you more years of service with the least maintenance. Shown here are but a few of scores of all types S-D Mine Cars regularly being built for coal mines. All are designed and constructed to give superior service for the lowest dollar. Whether you need one car or 101, don't hesitate to get one of our engineers into your mine—face-to-face with your problem. With this type of cooperation, plus our facilities and capacity to build any type mine car of any size, any haulage problem in your mine can be solved. *SANFORD-DAY IRON WORKS, Telephone 3-4191, P. O. Box 1511, Knoxville, Tenn.*

An S-D 8-WHEEL AUTOMATIC with four bottom dumping doors. Others have been designed and built with six doors. These S-D eight-wheelers also feature exclusive S-D "Twin Safety Latches" and "Safety Seal" against dust leakage.

Sanford-Day IRON WORKS

KNOXVILLE • TENNESSEE

AND BROWN-FAYRO DIVISION

MINE CARS, All Types - PRECISION WHEELS - "Brownie" HOISTS CAR RETARDERS - SPOTTERS PUMPS - OIL SPRAY SYSTEMS

3 PAYLOADER® models

Now you have a choice of three sizes of 4-wheel-drive "PAYLOADER" tractor-shovels, each with *all* the more-productive features pioneered and proven by The Frank G. Hough Co.

They have power-transfer differentials—an exclusive "PAYLOADER" tractor-shovel feature that maintains effective traction on mud, gravel, ice and snow.

They have "no-stop" power-shift transmissions and torque converters . . . planetary final drives . . . power-steering and 4-wheel power brakes.

They have the exclusive bucket motion with 40° bucket tip-back at ground level and powerful pry-out action.

For proof of their superior performance and greater productive capacity, ask your "PAYLOADER" distributor for a demonstration.

1	**Dig More**	Powerful pry-out action and 40° bucket tip-back at ground level get full bucket loads with less spillage loss. Power-transfer differentials provide sure-footed traction for digging power.
2	**Carry More**	Bucket carry position is close and low for maximum stability. Hydraulic system shock absorber cushions loaded bucket — smooths the ride — permits higher carrying speeds with less spillage.
3	**Deliver More**	Since you get MORE to begin with and keep MORE while traveling at higher speeds . . . with less spillage in both instances . . . the result — you deliver more yards per load and more loads per hour.

.. 3 WAYS BETTER!

The "PAYLOADER" line is the most complete, most proven tractor-shovel line — sizes from 1¼ cu. ft. to 2¼ cu. yd. . . . choices of front-wheel-, rear-wheel- and all-wheel-drive.

PAYLOADER®
MANUFACTURED BY
THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

THE FRANK G. HOUGH CO.

735 Sunnyside Ave., Libertyville, Ill.

Send full data on 4-wheel-drive "PAYLOADER" tractor-shovels.

☐ model HO	☐ model HH	☐ model HU
2¼ yd. heaped	1¾ yd. heaped	1½ yd. heaped
1¾ yd. struck	1½ yd. struck	1 yd. struck

NAME _____

TITLE _____

COMPANY _____

STREET _____

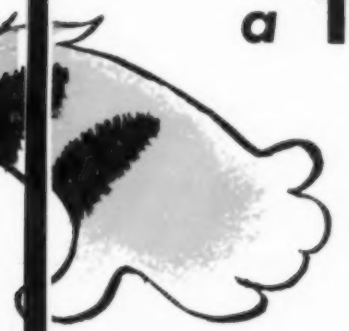
CITY _____

STATE _____

THREE SHARP BLOWS

AND YOU'RE DONE!

(That's all it takes to install a **TIGERWELD** *Wedge-type Bond)*



Our Tiger got a little mixed up. What you do is hammer the *wedge* on this Tigerweld Bond. Just three sharp blows and you've got a durable, low-resistance bond that is easy to remove if the track must be relocated. It hangs on in service, though. Is so dependable, in fact, that many mines use Tigerweld Wedge-type Bonds for permanent trackage.

Since no welding is required, and no precision drilling, you can save time and money with this bond wherever you use it. Write for complete information.

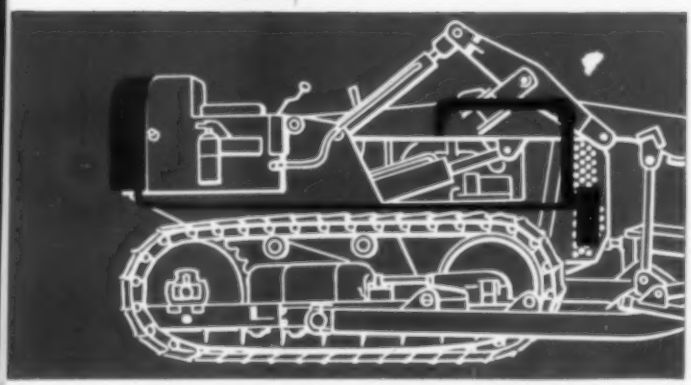
AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL, GENERAL OFFICES: CLEVELAND, OHIO

COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

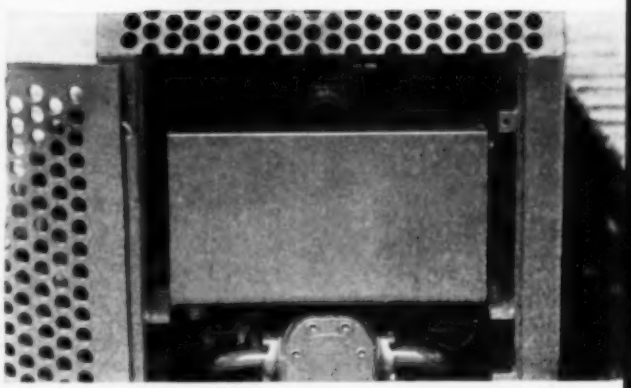
USS **TIGERWELD RAIL BONDS**

UNITED STATES STEEL

NEW International® TD-9



Compact, stainless steel scrubber is mounted neatly behind the radiator guard. No external "plumbing." Engine cooling is unaffected. Owner gets maximum 71 net hp. Scrubber cools exhaust gas from about 1000° F. to maximum 160° F., also removes harmful irritants.

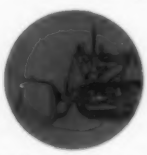


Scrubber and diffuser are easily accessible for servicing by opening radiator guard door. Diffuser breaks up cooled exhaust gas...regular engine fan blows air through gas at a ratio of 25-30 to 1, rendering final exhaust gas harmless to personnel, minimizing fire hazard.

NOW...get unmatched versatility underground with Drott special attachments

Exclusive Drott Four-In-One is a dozer, bucket, clamshell, and bullclam all in one ...a versatile utility tool for loading and clean up.

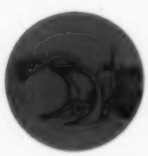
95-inch Drott bulldozer blade mounts directly onto Skid-Shovel lift arms. Depth of cut regulated by hydraulic control of blade pitch.



Drott angledozer blade ditches, slopes, dresses...can be set to either side. Operator tilts blade from seat.

Rock fork constructed of super-strong alloy steel...withstands abrasion of loading hard, tough minerals.

Third, extra valve of Drott Skid-Shovel, controls rear-mounted heavy-duty scarifier ...for tearing up ore beds.



Low profile, 2-prong grapple with top grab arm loads ties with full control.

Pallet fork lift attachment has two adjustable prongs for mounting of platform for drill jumbos or roof bolting.

Underground Mining Tractor

featuring...

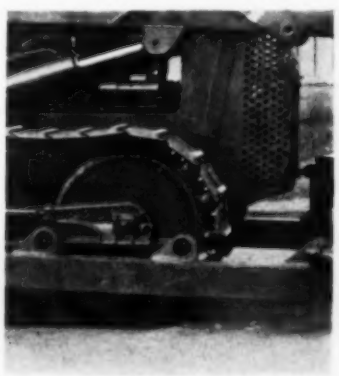
- **New, compact, exhaust gas scrubber... safe, integrally mounted!**
- **New 24-volt direct electric starting!**
- **New, low 6-foot height!**
- **Plus a complete line of interchangeable International Drott mining equipment!**

Now, International Drott announces a new crawler tractor completely designed and equipped for underground mining operations! Unusually compact and clean in design, the new tractor meets the U. S. Bureau of Mines' new safety standards for non-coal operations. It features the new Drott short-coupled, built-in exhaust gas scrubber and cooler. A new exhaust gas diffuser works together with the regular engine blower fan. And it has a new 24-volt, direct electric starting International diesel engine.

The new tractor has been lowered to 6 ft. to permit safe transport on low rail beds under low trolley wires. *Its length has not been changed* by the addition of scrubber and water reservoir tank.

The new TD-9 offers unmatched versatility and flexibility. It takes the standard 1½ cu. yd. Drott shovel, plus a narrow 46" shovel for tram car loading, straight and angledozer blades, special buckets, and the exclusive Four-In-One. Be sure to see the remarkable new TD-9 at the American Mining Congress.

Large 40-gallon capacity reserve water tank is mounted behind fuel tank, does not extend beyond drawbar. Capacity is sufficient for full eight-hour shifts. Level of water in scrubber is maintained at 4 inches by a stainless steel float.



For extremely heavy duty work, International bulldozer or bullgrader blades with separate outside push frames are also available.

INTERNATIONAL HARVESTER

INTERNATIONAL® Construction Equipment

International Harvester Company, 180 N. Michigan Avenue, Chicago 1, Illinois

A COMPLETE POWER PACKAGE INCLUDING: Crawler, Wheel, and Pipe-Boom Tractors . . . Self-Propelled Scrapers and Bottom-Dumps . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Trucks . . . Diesel and Carburated Engines . . . Motor Trucks

Intense heat no problem for Super Belts

This hydraulic press at Hackney Iron and Steel Co., Enid, Oklahoma, shapes red hot steel plate into tank heads.

The flat leather belt formerly used on this type of press, would stretch, slip, and come off. Tightening the belts only overloaded the bearings. For this press, a Gates Super Vulco Rope drive was chosen because it withstands the near-by intense heat, and its extra horsepower capacity permits lighter weight sheaves; thereby reducing load on bearings.

Claude King, maintenance superintendent, reports: "This Gates V-belt drive has operated 8 hours a day for 5 years without lost time due to maintenance."

Super Belts on vibrator last 7 times longer

James Gann, general superintendent of John B. LaGarde, Inc., Anniston, Alabama, reports:

"Practically every condition exists to shorten V-belt life on the vibrator drive of this concrete block machine. The machine starts and stops 4 times a minute. Intense vibration must be absorbed by the V-belts to protect motor and bearings. Sand and concrete, oil and grease all get into the drive.

"With Gates Super Vulco Ropes, we get about 7 times the average life we received from any other make, It is hard to believe that belts can take this punishment, but Gates Super Vulco Ropes do it."

Solve tough drive problems with this super tough V-belt

If present V-belts are wearing out too fast . . . if heavy shock loads . . . oil and heat . . . or other conditions are causing too frequent replacement . . . here's the answer:

Gates Super Vulco Rope—the oil and heat resistant V-belt with 40% more horsepower capacity. Easily handles heavy shock loads.

That means longer V-belt life and *cost savings two ways*—savings on belt replacements and savings on maintenance down-time.

Let a Gates V-Belt specialist help you solve *any* tough drive problem. He'll make recommendations without obligation. Gates offices and distributor stocks are listed in the phone book yellow pages in all major industrial centers. The Gates Rubber Co., Denver, Colorado—*World's Largest Makers of V-Belts.*

The Mark of Gates *Specialized Research*

TPA 104

Gates SUPER VULCO ROPE Drives

• *men who know coal from the ground up*

Your Choice of Weapons, Sir!

No. This is not a challenge to a duel. It is an invitation to work together towards the *single* purpose—cleaning your coals at lowest cost.

Actually, despite the emphasis given heavy media washing in recent years among coal washing experts, there are no two opposed schools of thought—the "heavy media school" and the "jig school."

It would be as reasonable to say that duck hunters are opposed to bear hunters because bear hunters use rifles.

You see, in both cases, whether you are washing coal or hunting, it is the target that indicates the weapon to be used.

The target in coal washing is, of course, different for each coal; moreover, the target is invariably obscured by economics. Not until the coal's washability is reconciled with its economics is the target clear. Obviously, this requires expert "stalking."

Only after stalking the washing problem can the expert select the right weapon for the job.

Fortunately, but certainly not by accident, MacPitt keeps every important coal washing weapon in its arsenal—heavy media, jigs, launders, dry cleaners, upcurrent washers, etc., so that the proper weapon can be selected on its merits.

Thereby we avoid the hazards of hunting bears with shotguns and the futility of hunting ducks with rifles.

Edward J. McNally

The McNally Pittsburg Mfg. Corp.
Pittsburg, Kansas

ask
the men who know coal
from the ground up

McNALLY PITTSBURG
MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUEL

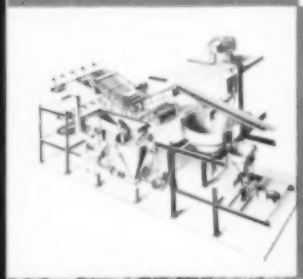
McNally Pittsburg Manufacturing Corporation—Manufacturing Plants: Pittsburg, Kansas • Wellston, Ohio
Engineering and Sales Offices: Pittsburgh • Chicago • Rio de Janeiro • Pittsburg, Kansas • Wellston, Ohio

FIRST CLASS
PERMIT No. 93
(Sec. 34.9, P. L. & R.)
PITTSBURG, KANSAS

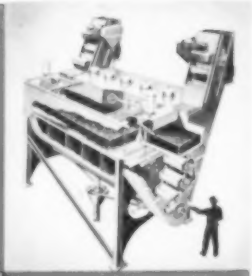
BUSINESS REPLY CARD
NO POSTAGE STAMP NECESSARY IF MAILED IN THE UNITED STATES

4c-POSTAGE WILL BE PAID BY—
McNally Pittsburg Mfg. Corp.
PITTSBURG, KANSAS

Some of McNally Pittsburg's weapons will give you a Bigger Bag of Profits

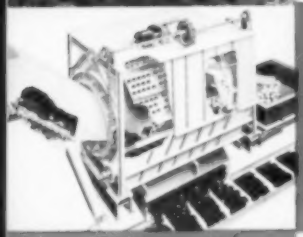


McNally Tromp Dense Media Washer



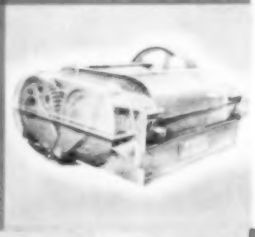
McNally Norton Washer

U. S. Steel Corp. at Gary, West Virginia



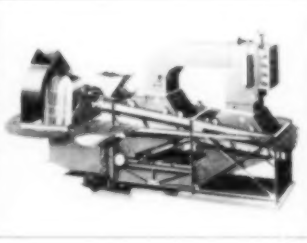
McNally Gearmatic Crusher

Old Ben Coal Corp., Mine 22, Franklin County, Ill.



McNally Heavy Duty Rotary Breaker

McNally Vissac Thermal Dryer



Today, again the woods are full of potential coal profits for you. McNally Pittsburg's one-stop service arms you with modern equipment geared exactly to your needs.

Complete plants, unit dryers, crushers, conveyors, or parts replacements—McNally Pittsburg offers the widest variety of any type of equipment. McNally Pittsburg engineering experience backs them all. Let the men who know coal from the ground up help you shoot for the biggest profits ever. Send post card.

Gentlemen:

☐ We need complete information on a complete new plant that will wash_____ inches by 0 at_____ tons per hour and dry_____ inches by 0 at_____ tons per hour.

We want information on the following special equipment:

Name_____ Title_____

Company_____

City and State_____

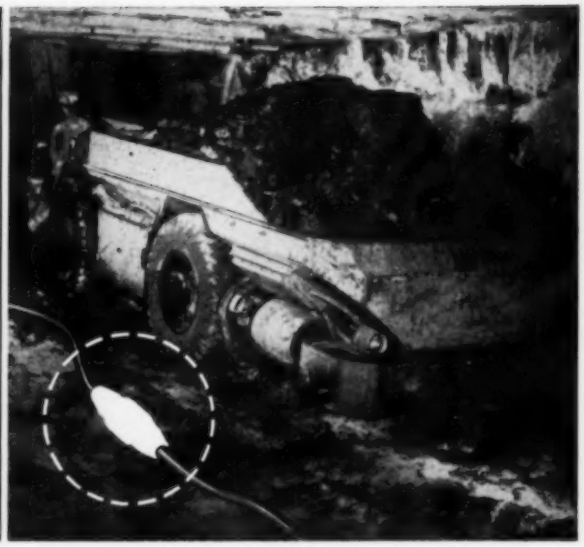
☐ Have Sales Engineer call for further consultation.

C

ask
the men who know coal
from the ground up

McNALLY PITTSBURG
MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUEL

McNally Pittsburg Manufacturing Corporation—Manufacturing Plants: Pittsburg, Kansas • Wellston, Ohio
Engineering and Sales Offices: Pittsburgh • Chicago • Rio de Janeiro • Pittsburg, Kansas • Wellston, Ohio



What Electrical Connectors would you choose ...for these installations?

Modern mining techniques allow little time for coddling men or equipment . . . so it's a safe bet your answer to the question in our headline will be based on more than just the electrical requirements of the equipment. Such important considerations as safety, efficiency, durability and maintenance cost, will influence your selection. *This is as it should be and we're glad it's true* . . . for the mining industry's constant search for the best available equipment has made JOY Electrical Connectors their preferred choice since 1928.

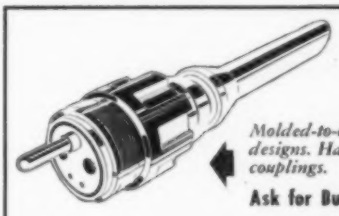
Why settle for less . . . when the best costs less in the long run?

JOY plugs and receptacles are specifically designed to provide long-range, maintenance-free service under the most adverse operating conditions . . . and they're available in styles and sizes to meet every mining need. Two of the currently *most popular* designs for mining installations are illustrated at right. Equipped with non-corrosive metal couplings and flame-resistant Neoprene bodies, both are moisture-tight, shatter-proof and distortion-resistant.

Straight Pin Bigun (SPB)—Have threaded metal couplings. Plugs are factory-vulcanized to 36" cable leads or to lengths as specified. See Bulletin B39a for complete information.

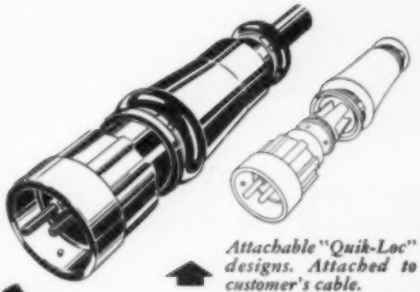
Attachable "Quik-Loc" styles—Attach quickly to customer's own cable. Newly designed couplings completely engage or disengage in ¾ turn. See Bulletin B57 for complete details.

JOY plugs and receptacles are available for both AC and DC applications. In addition, "SPB" and "Quik-Loc" connectors may be supplied with pilot control contacts for *permissible operation* when used in conjunction with JOY'S Bureau of Mines-Approved distribution centers (SCC units). Ask us for complete information, ***Joy Manufacturing Company, Henry W. Oliver Building, Pittsburgh (22) Pa.*** In Canada: *Joy Manufacturing Co. (Canada) Limited, Galt, Ont.*



Molded-to-cable "SPB" designs. Have threaded couplings.

Ask for Bulletin B39a.



Attachable "Quik-Loc" designs. Attached to customer's cable.

Ask for Bulletin B57.

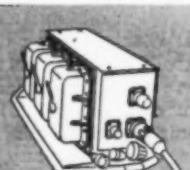
W&D CD5447

Consult a Joy Engineer

JOY

SPECIALISTS IN CREATING ELECTRICAL CONNECTORS FOR MINING AND INDUSTRY SINCE 1928

Write for information on these JOY products



Safety Circuit Centers

Distribution Boxes

Portable Lighting

New Cable Vulcanizer

ENGINEERING REPORTS:

HIGHLY MECHANIZED preparation plant helps Compass Coal meet customer demand for top-quality products at low cost.

Compass Coal Achieves Top-quality, Low-cost

CLOSE CO-OPERATION between G-E application engineers and J. S. Mathews, Compass Coal Division Superintendent, (right) assured smooth plant start-up.

General Electric system-engineered equipment plays key role as Compass plant expands to meet growing demand for coal

Compass Coal Company recently took another stride in the coal industry's intensified program of expansion and mechanization with the start-up of its new preparation plant at Dola, West Virginia. Designed for cleaning top-quality coal at a rate of 450 tons per hour at the company's Compass No. 2 mine, the modern Compass plant is an excellent example of an industry-wide move to reduce production costs through increased operating efficiency and electrification.

Working closely with Fairmount Machinery Company, the electrical contractor, General Electric engineers planned and designed an entire electrical system for the up-to-date Compass plant. Because of the closely co-ordinated sequencing necessary in preparation plants, each item of General Electric power distribution, control, and utilization equipment was system-engineered for maximum efficiency. This smooth-functioning system has assured Compass Coal Company of continuous, properly sequenced operation with more tons of coal processed per man-hour of labor and per kilowatt of power.

COMPACT CABINETROL* panel provides centralized motor control. Custom-engineered, they are easy to expand by adding new sections to existing panels.

TOTALLY-ENCLOSED G-E Tri-Clad* motors driving vacuum pump are protected against dust, dirt, and abrasives. Motors are built for this severe duty.

MINIMUM MAINTENANCE is necessary with sturdy, long-life Tri-Clad* motors providing reliable power for run-of-mine conveyor at initial cleaning stage.

RUGGED TRI-CLAD '55' MOTOR drives Deister concentrating table at the fine-coal cleaning stage of the preparation process where compactness is a must.

Production with New Preparation Plant

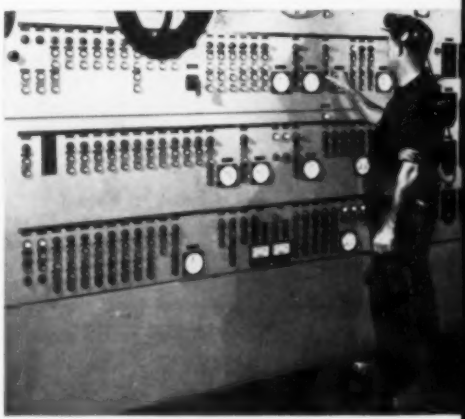
When increased energy demands from industry and utilities cause you to plan an expansion or modernization of your preparation facilities, call in General Electric early in the planning stages. Long experience in the electrification of many coal cleaning plants—large and small, wet and dry—has made G-E engineers thoroughly familiar with the methods and problems of coal preparation. This experience, coupled with the broad range of products manufactured, makes General Electric particularly well prepared to design and furnish the co-ordinated electrical equipment for your coal preparation plant.

To learn more about General Electric's modern electrical systems for coal preparation plants, contact your nearest G-E Apparatus Sales Office or write to General Electric Co., Sect. 663-45, Schenectady 5, N.Y.

*Reg. Trade-mark of General Electric Co.

Engineered Electrical Systems for the Coal Industry

GENERAL ELECTRIC



NERVE CENTER of preparation plant operation is G-E master control panel. Starter buttons are arranged in proper sequence to control cleaning operations.

Big output without costly breakdowns—even in rock! That's typical of Limas like this rugged Type 2400 stripping overburden near Mt. Claire, W. Va.

Rock and Shale won't stop this rugged LIMA 2400

Rock and shale won't stop this rugged Lima Type 2400 5½ yd. shovel. It strips down to coal level fast . . . through any type of overburden. Lima quality gives it the tough construction, extra weight and smooth power to handle the toughest stripping jobs, at top speed, day-in and day-out.

You can't beat the Type 2400 for big output; fast, easy, economical operation; minimum repair and maintenance . . . no matter how hard the digging. Get the full story today from your nearby Lima distributor, or write Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

COMPARE QUALITY! No other machine gives you as much as LIMA!

1. Piston-type dirt seal rings and retainers in crawler rollers.
2. Moving parts are flame or induction hardened for longer life.
3. Two-shoe swing and propel clutches; air control.
4. Anti-friction bearings at all important bearing points.
5. Big capacity drums and sheaves are easy on cables.
6. Propel and swing gears and power take-off are enclosed in a sealed oil bath.
7. Torque converter (standard equipment).
8. Wherever you are, you can depend on skilled service and nearby warehouse stocks of parts to keep your LIMA on the job continuously.

COMPARE and you'll specify LIMA for shovels (½ yd. to 6 yds.), cranes (to 110 tons) and draglines (variable). Smaller capacities available on rubber.

DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

BALDWIN BLH LIMA-HAMILTON

LIMA SHOVELS • CRANES • DRAGLINES • PULLSHOVELS

BALDWIN-LIMA-HAMILTON

Construction Equipment Division — LIMA WORKS

OTHER DIVISIONS: Austin-Western • Eddystone • Electronics & Instrumentation • Hamilton • Loewy-Hydropress • Madsen • Pelton • Standard Steel Works

H&L Teeth that really DIG

SHARP teeth mean more ditch

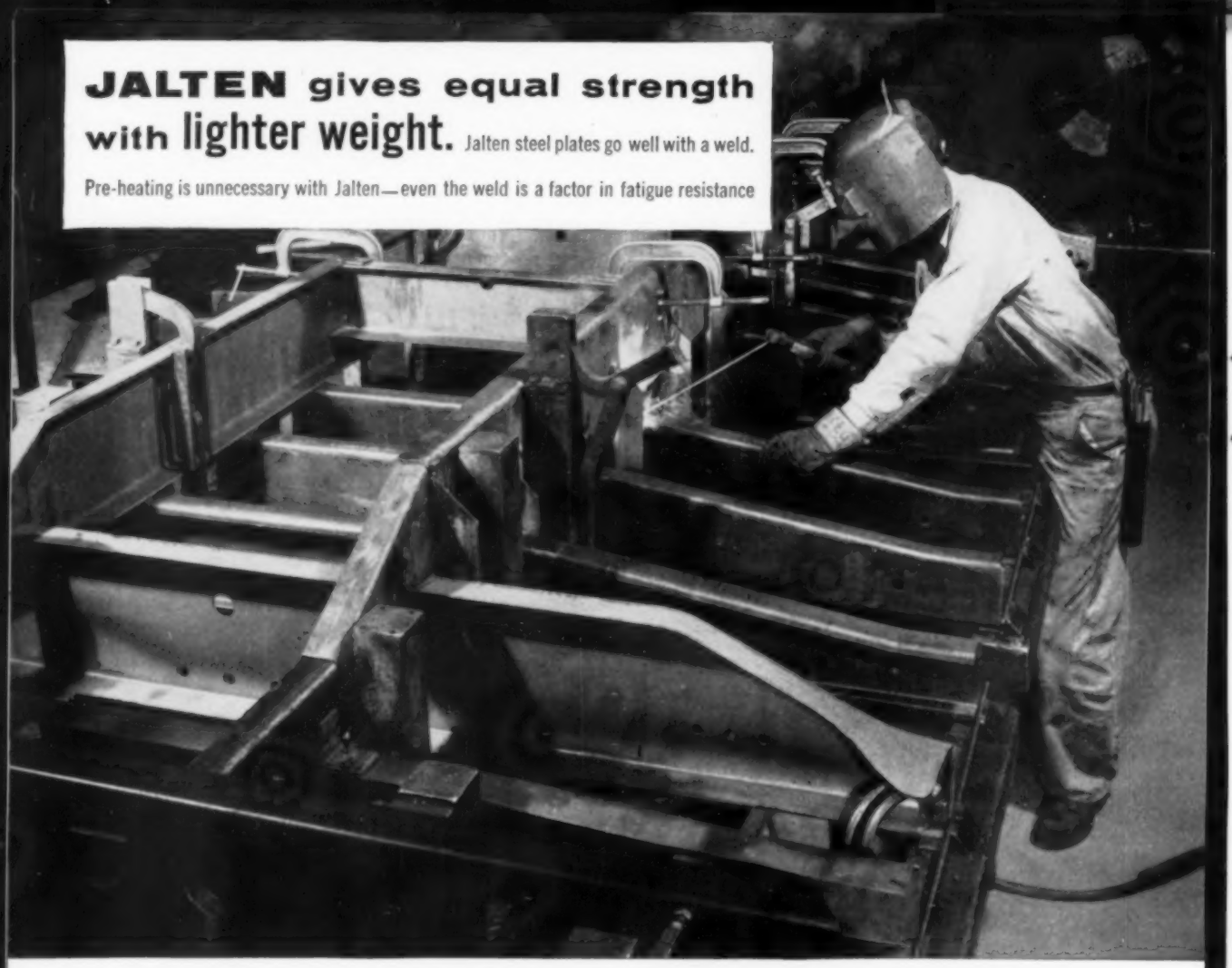
FORGED ALLOY STEEL D means greater strength

added up means more profit

H&L TOOTH COMPANY

1540 South Greenwood Avenue
Montebello, California

25th Silver Anniversary


JALTEN gives equal strength
with lighter weight. Jalten steel plates go well with a weld.
Pre-heating is unnecessary with Jalten—even the weld is a factor in fatigue resistance

Low alloy, high strength Jalten offers good formability coupled with excellent corrosion and abrasion resistance

Jalten's high strength permits high design loads. It also permits a reduction in section when used to replace mild steels. Usually the reduction amounts to two gages affording a weight savings of approximately 25 per cent. Thus, dead weight can be eliminated—resulting in increased carrying capacity. Also, it is easily welded.

Jalten is furnished in four grades:

No. 1—possesses high strength, good formability and fabricating qualities—good resistance to low temperature impact.

No. 2—offers high strength, moderate formability—improved resistance to atmospheric corrosion.

No. 3—gives high strength—improved resistance to abrasion.

No. 4—provides superior formability and surface quality for bumper stock applications requiring plating.

Jalten Steels are available as sheets, strip, plates, structurals, bars and small shape sections.

SEND FOR THIS NEW BOOK:
Chemical properties of Jalten
Mechanical properties of Jalten
Jalten equivalents
Jalten application data

Jones & Laughlin
STEEL CORPORATION · PITTSBURGH

J&L STEEL

How the Piggyback Conveyor System... keeps continuous mining machines working more hours per shift

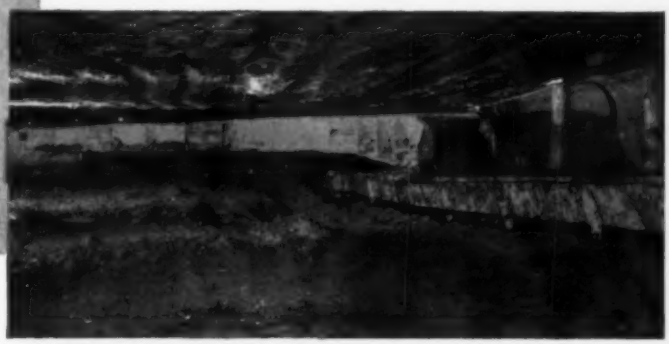
Third Pass
Second Pass
First Pass
Continuous Mining Machine (Any Type)
Approximate length . . 30'
LONG Model "88" Pigloader *
Receives directly from miner . . . serves as a mobile conveyor . . . provides mechanical cleanup and surge capacity . . . trams Piggyback* Conveyor.
Approximate length . . 17'
LONG Piggyback Conveyor
Transfers coal from loader into room conveyor without interruption or spillage. Pivot action of 180° at each end permits complete freedom of movement.
Approximate length . . 32'
Total Approximate Reach Away From Room Conveyor . . . . 79'
Enough to reach completely through breakthroughs, mine forward from breakthrough to breakthrough, pillar substantial blocks, etc.
LONG Mobile Chain-type Room Conveyor
Equipped with crawler-mounted, self-tramming conveyor drive, moving time is eliminated because one man can move and position this mobile head in less time than it takes to move the miner itself.
Approximate operating lengths. . . . . up to 400'.
Mobile Head
* Trade Mark
LONG Chain-type Gathering Conveyor

As many leading coal companies already know, the Piggyback Conveyor System is the most practical, most economical method of face transportation for continuous mining. Because it eliminates lost time for car changes, this continuous-flow equipment assures maximum working time at the face—makes it possible for continuous mining machines to operate more hours per shift. Coal is loaded and moved from the face to the outside in a steady, uninterrupted stream *as fast as it's mined.* The result: more tons per man, higher continuous tonnages and less cost per ton.

Whether you're using continuous mining machines or conventional mining units, it will pay you to consider the many advantages provided only by the Piggyback Conveyor System. We'll be glad to supply complete information—without obligation.

Check these advantages of the Piggyback System for continuous mining

Fewer delays • Higher capacity • Lower maintenance • Fewer men in face crew • Fewer nonproductive men • Less down time • Better cleanup • Better operator attention • Greater concentration of mining • Longer economical haulage distances.



Piggyback Conveyor System in operation, servicing continuous mining machine that has delivered single shift tonnages of over 800 tons. Receiving end of Piggyback is attached to Pigloader loading machine and follows it as it moves.

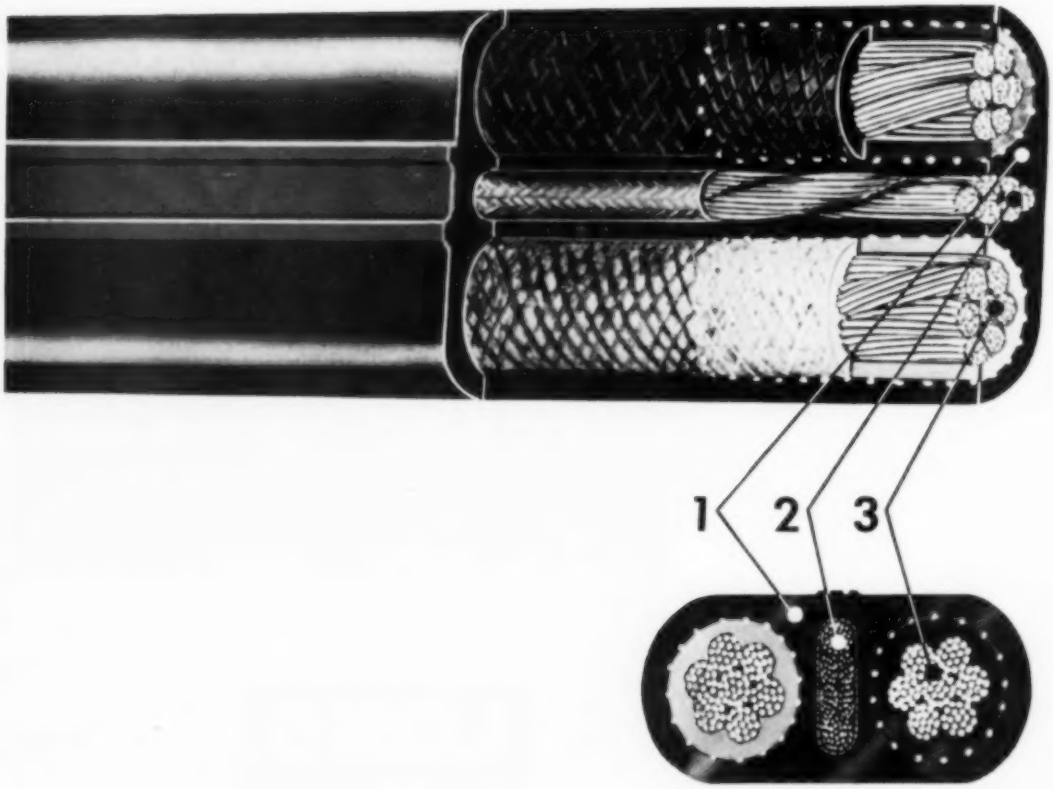
The **LONG** *Company*
OAK HILL, W VA

Tire-tough, compact construction molded in lead, protects new Rome 60® mining cable against all kinds of abrasion.

Firm integrated construction prevents separation of insulated conductors from sheath normally caused by twisting, pulling and flexing.

Specially compounded rubber insulation and Neoprene sheath prevent damage from moisture, acids, and corrosion.

Scrape it, twist it, soak it,



Neoprene web between insulated conductors provides high impact and crushing resistance, protects cable from shorts.

You can't bend Rome 60 parallel duplex cable on its major axis. Sheath is so interlocked to insulated conductors in new integrated design, that the conductors cannot slip within the sheath. Cable flops over on minor axis when flexed, escapes the distortion and weakening of "wrong-way," major axis bends.

crush it, try to bend it

on its major axis

Here's why new *integrated* design of Rome shuttle car cable will take the worst your mine can offer

Torture it as you will, you cannot detract from this new Type G flat twin cable's ability to take gruelling punishment week after week, month after month, without breaking or shorting.

Notice the web between power conductors and ground on the new cable (1). Part and parcel of the cable's tough Neoprene sheath, the web is strong but supple and resilient.

Result: sheath, web, power conductors, and ground form *one integrated unit*. The sheath will not separate from conductors no matter how you twist or flex it.

2 other new features

We have increased the number of strands of the ground conductor and power conductors (2 and 3). Result: greater flexibility, greater resistance to damage from the rigors of mine service.

The new ground conductor (2) also has a closely woven fibrous covering which minimizes the mechanical working of individual strands when the cable is flexed.

Free sample. Write for a 2-foot sample of the new cable. Give it the punishment it was designed to take. Prove to yourself that it's the most rugged, most dependable shuttle car cable you can buy.

With the sample, we'll send a bulletin describing the new cable in detail.

It costs less to buy the best

ROME CABLE Corporation
ROME · NEW YORK
and
TORRANCE · CALIFORNIA

PERFORMANCE REPORT ON AMERICA'S BEST SELLING TRUCKS:

"WE ORDERED 10 CHEVY TANDEMS . . . ONE OF THE MOST PROFITABLE MOVES WE'VE EVER MADE!"

. . . says Mr. F. Roland Sargent, Sargent Construction Company, Saginaw, Michigan—a typical user of Chevrolet heavy-duty trucks.

"After sizing up these new models . . . we ordered 10 of them. *And let me say it has been one of the most profitable moves we've ever made.* During the wet spring this year, we had conditions on a job near Bay City which were worse than our firm has ever operated in . . . I honestly didn't think any truck could plow through that sea of wet, oozy muck. But we decided to make a try. When those Chevy tandems went in, the mud sucked them down on their axles . . . sometimes two-thirds of the wheels were actually buried . . . those trucks were literally crawling on their bellies. But they kept rolling. And, to my amazement, we didn't even have to lighten the nine-ton loads!

"Let me sum up by putting it this way. We've put in a new order to enlarge our Chevrolet tandem fleet."

Why not see *your* dealer soon? . . . Chevrolet Division of General Motors, Detroit 2, Mich.

***Modern features* make new Chevrolet trucks the Performance Champs of the Heavyweight Class!**

New short-stroke 195-hp Loadmaster V8 powers Chevrolet top-tonnage trucks!

New Powermatic* — the first automatic transmission designed specially for big trucks!

New Triple-Torque Tandems hike G.V.W.'s to 32,000 lbs., G.C.W.'s to 50,000 lbs.!

Spicer 5-speed transmission† for extra pulling power, improved economy.

*Optional, extra cost, Series 5000 through 10000 models.
†Optional, extra cost, Series 9000 and 10000 models.

CHEVROLET

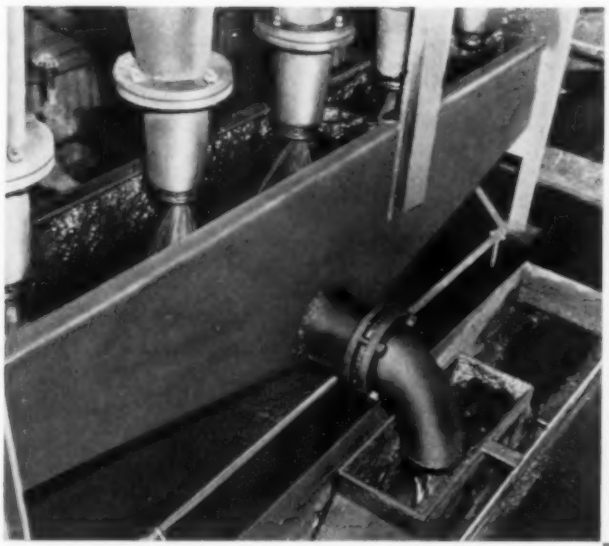
NEW CHEVROLET TASK·FORCE TRUCKS

Anything less is an old-fashioned truck!

Fine Coal Recovery means

21 x 21 x 20 x 3 + X

(SUBSTITUTE YOUR OWN OPERATING FIGURES)



each month

H&P Cyclones recover salable fine coal at the rate of 21 TPH, about 21 hours per day, for 20 days of each month with a minimum return of $3 per ton. The "X" represents the expense to provide sufficient area for fine coal disposal.

Moreover, our numerous files indicate similar savings repeated in all sections of the coal field.

These applications can often be amortized by less than one year's production.

Heyl & Patterson CYCLONES

add to your profits, help in controlling density and let you operate through continued dry spells as water requirements are reduced.

Only proper plant testing, followed by reliable laboratory analysis and competent application engineering guarantee an installation capable of giving you such good returns. H&P has all these facilities ready to serve you.

CHECK THESE ADVANTAGES!

- ☐ Closed circuit operation
- ☐ Recovery of fine coal
- ☐ Prevention of stream pollution
- ☐ Controlled washing water densities
- ☐ Conservation of water
- ☐ Sharp classification for washing operation

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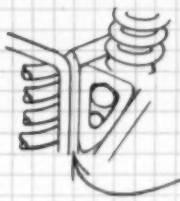
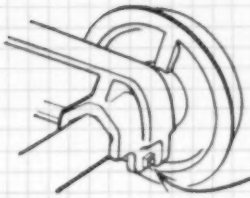
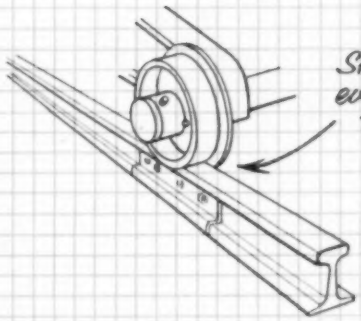


Movement between bolster and side frame is taken on specially designed wear surfaces

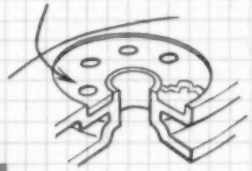


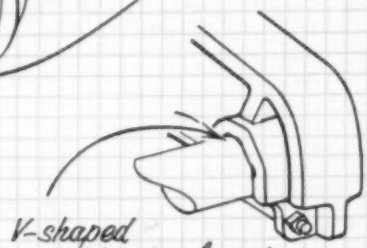
Quick wheel change



Smoother ride even on rough tracks

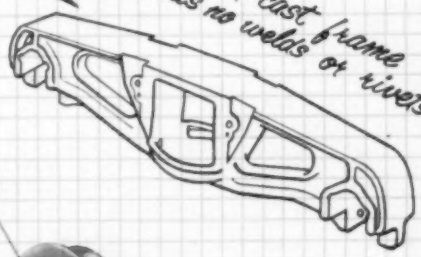
Large center bearing for longer life





V-shaped machined axle grips for controlled flexibility and truck alignment

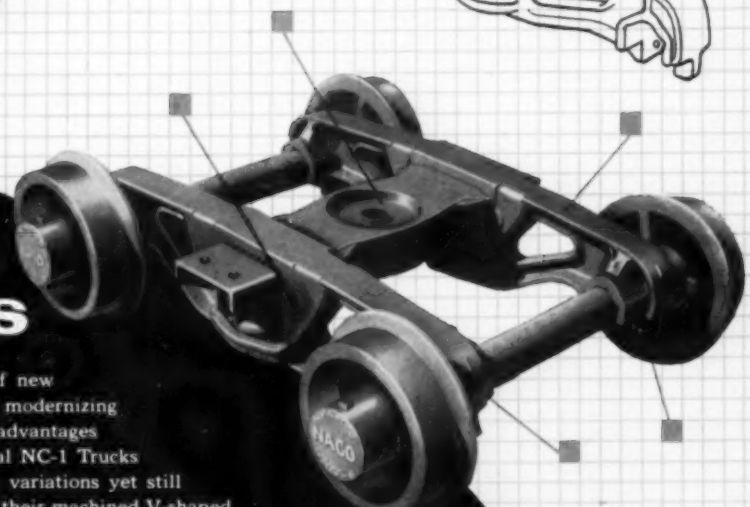
Integral cast frame has no welds or rivers



Check these "plus" features

OF

NATIONAL NC-1 TRUCKS



If you're considering the purchase of new 8-wheel mine cars . . . or if you're thinking of modernizing older cars—*now* is the time to check the advantages of National NC-1 Trucks. National NC-1 Trucks have controlled flexibility for track variations yet still maintain truck alignment through their machined V-shaped axle grips. In addition, NC-1 Trucks have a built-in shock absorbing mechanism.

You get more out of your mine car investment per workshift . . . per day . . . per year. And at the same time you minimize spillage . . . get greater protection for your equipment, track and structures . . . slash maintenance to a new low.

Yes, *now* is the time to check National NC-1 Trucks—they make sense for 8-wheel mine cars . . . *make dollars for operators*, too.

AA-2683

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RUBBER CUSHIONED UNITS
NC-1 CAR TRUCKS • NACO STEEL WHEELS
NACO STEEL LINKS & SWIVEL HITCHINGS

NATIONAL MALLEABLE and STEEL CASTINGS COMPANY

Cleveland 6, Ohio

Time is Money - SAVE IT

with the **Lee-Norse BUS & JITNEY**

Take a real good look at these LEE-NORSE "TIME-SAVERS"! Like modern misers they hoard minutes into extra productive hours by cutting portal to portal time—reducing costs—increasing tonnage output.

Lee-Norse MINE PORTAL BUS

This self-propelled Portal Bus for section production crews has a split roof giving the driver an unimpeded, all-directional view . . . the trolley is always within easy reach of the operator. Every Portal Bus is built to fit the particular need of the seam and depending on the clearance will haul from 14 to 20 men. It is efficiently powered by two (2) motors and has two independent braking systems for complete safety — (airplane-type) disc brakes are smoothly operated by either hydraulic or mechanical means.

TIME IS MONEY — SAVE IT with the Lee-Norse Mine Portal Bus!

Lee-Norse JITNEY

Wherever they're in use—they're regarded as a time saving asset. Fleet and versatile the Jitney furnishes quick, sure transportation to and from the working face for key personnel, inspectors, engineers, etc. When required the Jitney can be pressed into service as an ambulance and is suitable for pulling fire fighting equipment.

TIME IS MONEY — SAVE IT with the Lee-Norse Jitney.

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DESIGNERS AND BUILDERS OF THE FAMOUS LEE-NORSE MINER

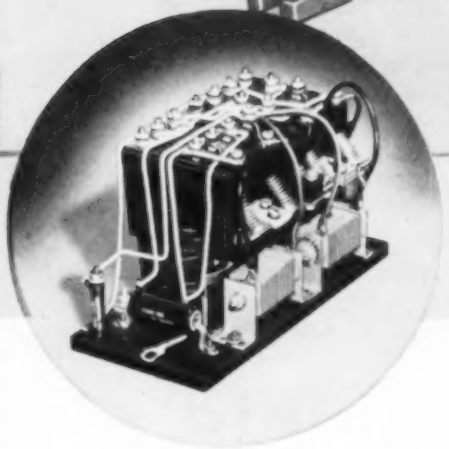
NOW—CONSTANT PROTECTION

Against GROUND FAULT HAZARDS

in your mobile, off-track equipment!

RELAY CASE
May be mounted anywhere on the machine
CONTROL STATION
With signal light, placed where most convenient for operator

THE NEW
NATIONAL MINE
GROUND SENTINEL



Certified by U. S. Bureau of Mines, File X/P-700

Accepted by Division of Coal Mine Inspection

The Ground Sentinel is a continuous resistance monitor opening the control instantly should the frame potential exceed 40 volts at 41 milli-amperes. It protects against shock and fire hazards if a ground fault occurs. It prevents damage to motors and control, and its forewarning action is an effective means of indicating the need for preventive maintenance. The Ground Sentinel soon pays for itself and continues to offer appreciable operating advantages and savings. Write for complete Ground Sentinel details!

National Mine Service Company

564 ALCOA BUILDING PITTSBURGH 19, PA.

has the facilities—delivers the goods

Call your National Mine man for the facts!

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KY.-VA. DIVISION
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BEMECO DIVISION
Beckley, W. Va.

WESTERN KY. DIVISION
Madisonville, Ky.

WHITEMAN DIVISION Indiana, Pa., and Morgantown, W. Va.

Keep it up!

The life you save may be your kid's!

THE ENSIGN-BICKFORD COMPANY

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Manufacturers of Primacord® Detonating Fuse, Ignitacord® Quarrycord, Blasting Accessories -- and Safety Fuse since 1836

Devoted to the Operating, Technical and Business Problems of the Coal-Mining Industry

Coal Age

SEPTEMBER, 1956

IVAN A. GIVEN, EDITOR

New Era

GOOD EVIDENCE supports the conclusion that bituminous coal will reach a production level of at least 600,000,000 tons in 1960. At the same time, there is reason to believe, despite some dissenters, that anthracite has hit bottom and at the worst should be able to maintain approximately its present production rate for the next few years, and might even look forward to the possibility of some increase.

But though the future outlook is good, it is "not automatic," as noted by one executive responding to the *Coal Age* survey of plans for new mining capacity and capital expenditures in the next five years. The results of the survey are presented in the report beginning on the following page of this issue.

First, if the industry is to meet the rising demands of the future, it must provide the necessary increased producing capacity, in addition to replacing worked-out operations. At the same time, care must be taken to avoid creating excessive overcapacity. The data submitted by the organizations contributing to the *Coal Age* study indicate (a) that the increased capacity will be provided and (b) that the total will not be excessive in view of expected demand in 1960.

Second, the industry must continue to meet cost and quality requirements imposed by competition—not only internal but from other fuels. There will be no relaxation of the pressure. The industry will continue to meet the challenge, since reporting companies expect to up tons per man one-third to one-half in the next five years.

Since the job ahead looms up as one of the biggest in the history of the industry, it follows that the level of capital expenditures will reach a new high—$1½ billion or more on the basis of known plans for the next five years and forecasts of further rises in demand in the years after that. Results reflect expenditures, but money in such volume increases the need for wise use of the things the money buys to cut cost, raise quality and provide the necessary capacity increases. This, if the comments of those responding to the planning questions are any criterion, the industry realizes.

The point of all this? One, it is now more evident than ever that coal has a major opportunity to grow in the years ahead. Two, the industry is gearing up production and preparation facilities to take advantage of that opportunity. Moreover it is building merchandising and research programs to match the production and preparation setups. The net result can well be a new era of progress and prosperity.

More Evident

SEIZURE of the Suez Canal by Egypt makes it more evident than ever that dependence on foreign sources of critical materials is a chancy business, even in these days of so-called peace. True, some materials must be obtained abroad either because the United States does not have them or does not have them in sufficient quantity. But where there are ample reserves in this country, it is scarcely wise to wash out domestic producing facilities simply because it is momentarily cheaper to rely on foreign sources.

At issue in the Suez incident is oil, and the seizure shows how easy it would be to interrupt its movement across national borders anywhere in the world, even in peacetime. That is why, in enlightened self-interest, the United States coal and petroleum industries have been campaigning against excessive importation of crude and products, including residual, since the net result would be a reduction in domestic producing capacity that might be disastrous in time of emergency. The Suez seizure vividly highlights the validity of their case.

Building for 1960

Increased Capacity

Through increases at existing properties and the development of new mines, the bituminous industry will raise productive capacity to 675 to 700 million tons by 1960, or a modest margin over the expected level of demand of 610 million tons. Anthracite plans no major change.

Tons per Man

Output per man-shift will be increased over 3 tons at deep mines and nearly 4 tons at strip mines by 1960, or one-third higher than the present average at deep mines and one-sixth at strip mines.

Capital Investment

To provide for increased capacity, and to attain higher output per man, the bituminous industry will spend approximately $1½ billion in the five years 1956-60, inclusive.

A NEW HIGH in capital expenditures is being scheduled by the coal-mining industry in the next 5 yr. The major reasons are two:

1. General acceptance of the fact that the bituminous industry must grow substantially to meet rising demands.

2. Continuation and intensification of the pressure for lower cost and higher quality.

Bituminous demand potentials are indicated in the *Keystone-Coal Age* forecast of consumption, as follows:

	Millions of Tons		
	1956	1960	1965
Utility[1]	157	210	282
Coke (steel & chemical)[2]	114	130	175
Other industrial[3]	112	140	180
Railroad	14	12	20
Retail	57	58	50
Exports, Canada	17	10	13
Exports, overseas	42	50	65
Gas & oil synthesis[4]	...	...	70
Totals	513	610	855

1. Including low-temperature carbonization. 2. Including taconite. 3. Including aluminum, titanium and zirconium. 4. Highly speculative.

The anthracite picture is discussed more fully in a special section (p 57). An increase in demand might occur but is not forecast. However, the industry is expected to hold its own in tonnage for the next several years, and is under the same pressure to cut cost and raise quality.

The Coal Program: 1956-60

With a target of some 610 millions of bituminous for 1960, one of the questions is whether the necessary new capacity will be provided. And since cost and quality will be no less

in importance in the years to come, a collateral question is how the industry plans for the necessary advances in these directions in the next 5 yr and beyond. To get the answers to these and other questions involved in planning ahead, *Coal Age* decided to go to the industry for specific data on its plans.

Data on planning were supplied by 79 bituminous organizations controlling some 111 operating companies that expect to produce 164,248,000 tons in 1956, or nearly one-third of the total, and by anthracite organizations that will account for over one-quarter of that industry's output this year, or 7,700,000 tons. The basic conclusions to be drawn for this "*Coal Age* Study of Industry Planning" can be summarized as follows:

1. Bituminous production capacity will reach 675 to 700 million tons around 1960, up from 550 million tons in 1955. Capacities for both years are "practical" capacities which the industry can attain without overtime or crowding. To attain the 1960 level, the industry will provide 235 to 260 million tons of new and replacement capacity, of which it is estimated that 110 millions will be replacement for existing capacity.

On the basis of industry plans, and assuming a demand of 610 million in 1960, overcapacity would range from 11.7 to 14.7% in that year. Since industry experience over the years indicates that the minimum necessary to accommodate normal variations in demand is about 10%, and that the industry begins to run into difficulties only when the excess is over 25 or 30% for a long period of time, an excess of 12 to 15% is one the industry can bear without undue difficulty.

2. Output per man-shift at deep mines will increase over 3 tons between now and 1960, or one-third higher than the present figure. The greatest increases will take place in coal under 4 ft. Output at strip mines is expected to increase 3¾ tons per man-shift, or 17%, on the basis of estimates by companies supplying data for the survey.

3. Total capital expenditures probably will reach $1½ billion for the 5-yr period ending with 1960, not only for increasing mine capacity and for modernization, but to lay the groundwork for mines that must be brought into production after 1960 to meet new demands and replace worked-out facilities. Available data indicate that this is a new high in spending for a 5-yr period. The total for 1956, on the basis of projections from available figures, is conservatively estimated at $250 to $260 million.

How 83 Producing Organizations Plan To Meet Rising Coal Demands

Bituminous Organizations Producing 164,248,000 Tons In 1956

Anthracite Organizations Mining 7,700,000 Tons in 1956

By Adding To Existing Mine Capacity

Thousands of Tons Added

	1956	1957	1958	1959	1960	Total
Deep bituminous	11,758	7,859	8,475	1,545	1,680	31,317
Strip bituminous	2,930	4,772	3,710	4,620	380	16,412
Anthracite	300	300	200	....	....	800
Total	14,988	12,931	12,385	6,165	2,060	48,529

By Opening New Mines

NUMBER

	1956	1957	1958	1959	1960	Total
Deep bituminous	13	16	10	5	9	51
Strip bituminous	7	9	2	4	2	24
Anthracite	1	.	.	.	.	1
Total	21	25	12	9	11	76

CAPACITY

Thousands of Tons

	1956	1957	1958	1959	1960	Total
Deep bituminous	5,900	7,890	11,450	6,600	5,150	36,990
Strip bituminous	7,900	9,190	2,100	3,200	200	22,590
Anthracite	400	....	....	....	....	400
Total	14,200	17,080	13,550	9,800	5,350	59,980

By Raising Tons Per Man

WEIGHTED AVERAGE

	Under 4 ft		Over 4 ft		All	
	1956	1960	1956	1960	1956	1960
Deep bituminous	8.1	12.5	8.8	11.8	8.7	11.9
Strip bituminous	....	....	....	....	21.6	25.3
Deep anthracite	....	....	....	....	3.4	3.7

Through Higher Capital Investment

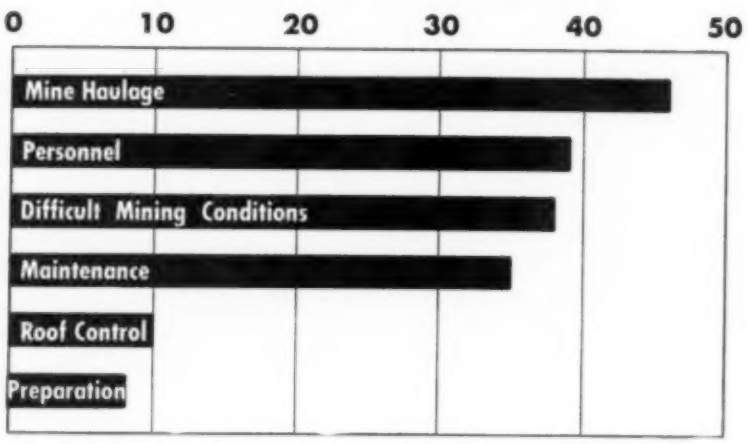
Thousands of Dollars

	1956	1957	1958	1959	1960	Total
Deep bituminous	$58,148	$52,618	$34,034	$24,950	$18,000	$187,750
Strip bituminous	33,500	17,925	13,825	11,870	8,480	85,600
Anthracite	1,450	1,800	800	700	700	5,450
Total	$93,098	$72,343	$48,659	$37,520	$27,180	$278,800

* Lower expenditure figures for the years following 1956 undoubtedly will be revised upward not only as a result of sceduling new capacity to meet rising demands after 1960 but also because, according to McGraw-Hill's experience in surveying plant and equipment expenditures in times of an expanding economy, the totals rise as organizations move closer to the actual expenditure period.

These Bottlenecks Must Be Broken...

REALIZING the full potentials of the 1960 market will not be automatic. Capacity expansion and capital spending must be geared to reduce costs and increase output per man shift.



4. A major increase in the use of continuous miners will feature the next 5 yr, during which the industry hopes for improved face and pit haulage for higher efficiency, machines that will provide higher capacity with less maintenance, more effective roof control underground, and a major improvement in supervisory and worker skill.

5. Expected increases in demand will be realized. In other words, the coal industry looks forward to an era of expanding production. At the same time, the industry realizes that better times are not automatic, and recognizes that progress will reflect, among other things, higher investment for lower cost and higher quality, better merchandising and more research.

More detailed discussion of the future plans of the reporting companies, and of the conclusions drawn from these reports, are the subjects of the following sections.

Capacity Increases

Q. Do you plan expansion of company output by modernizing or expanding present operations during the next 5 yr? If so, what annual tonnage will be added in each year 1956-60?

Q. Do you plan to open any new mines in the next 5 yr? If so, indicate number and total capacity for each year 1956-60.

Present Mines—Reporting deep and strip producers plan to add 31,317,000 and 16,412,000 tons, respectively, to the capacity of the mines they now operate. Additions by years are shown in an accompanying table. The peak year for strip will be 1957, with 4,772,000 tons; for deep, 1958, with 8,475,000 tons.

New Mines—New properties are planned by 65 of the bituminous organizations reporting. These organizations control some 95 producing companies. The new properties to be opened by these companies total 75 in the next 5 yr, of which 51 will be deep and 24 strip. The peak year is 1957, when deep and strip organizations plan to open nearly one-third of the 5-yr total. In the 2-yr period 1957-58, over half the new mines (25 deep and 12 strip) will come into production if the companies follow through on plans. As between deep and strip, the peak year for deep will be 1958, with 11,450,000 tons of new capacity; for strip, 1957, with 9,190,000 tons.

All Properties—Reporting deep bituminous producers plan to increase capacity 68,307,000 tons by opening new properties and raising the output of existing facilities. The planned new capacity is equivalent to 63% of their expected 1956 output. Indicating a slightly faster rate of expansion, reporting strip companies plan a total capacity increase of 39,002,000 tons, equivalent to 70% of their expected 1956 output. The total increase for both deep and strip organizations reporting is 107,309,000 tons, of which 59,580,000 tons, or 56% will come from new mines.

Industry Total—Although the reporting companies produce only about one-third of the present bituminous total, they include most of the larger producers which might be expected to account for the majority of the new capacity. On this basis, therefore, it is estimated that their rate of activity will not carry throughout the industry, and that their plans for 107,000,000 tons of new capacity will not indicate an industry total increase of over 32,000,000 tons, but instead some 235 to 260,000,000 tons in the period 1956-60. This would bring the total industry capacity up to 675 to 700,000,000 tons in 1960, which, as previously noted, would be only slightly higher than the necessary margin of 10% over expected demand.

Output per Man-Shift

Q. How much change in output per man-day (all mine employees) do you expect in the next 5 yr? What is present output per man-day? What do you estimate for 1960?

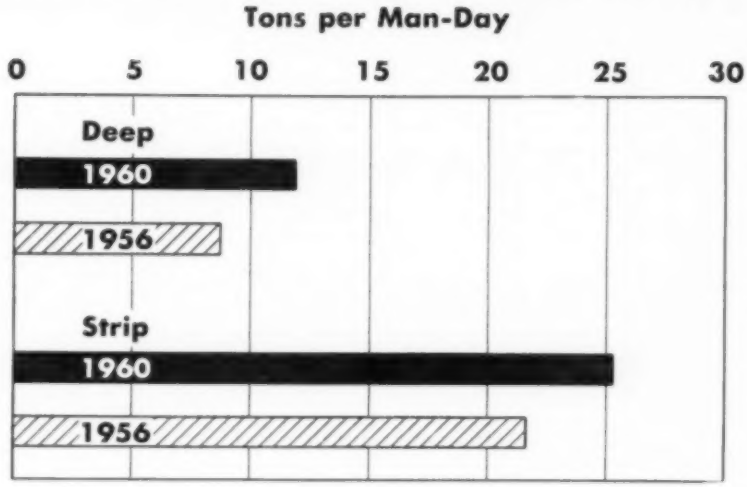
Major gains in worker productivity are expected by reporting producers in the next 5 yr (see accompanying table). Companies producing solely by underground methods, or primarily underground even though doing stripping, expect increases in tons per man as follows: coal under 4 ft, from an average of 8.1 in 1956 to 12.5 in 1960; over 4 ft, from 8.8 to 11.8 tons. Companies producing solely or predominantly by stripping expect that their average tons per man will rise from 21.6 in 1956 to 25.3 in 1960.

Q. What do you consider are the most important factors in effecting this change in tons per man?

In order of number of times mentioned, the major factors involved in this expected increase in tons per man by the reporting companies are:

1. Faster, higher-capacity haulage systems, particularly underground, re-

. . . To Reach These Production Targets



sulting from higher-capacity equipment and improved techniques.

2. Better equipment for difficult mining conditions, such as are met in thin-seam mining underground and deep overburden in stripping.

3. Improved personnel policies which will provide (a) better recruiting and training of supervisory, engineering, maintenance and working forces and (b) incentives aimed at encouraging greater effort on the job and less absenteeism.

4. Maintenance programs designed to cut breakdown time to a minimum with a minimum cost for the maintenance work itself. Such programs should emphasize prevention of breakdowns and greater cooperation with equipment manufacturers in the redesign of equipment to effect low maintenance.

5. More effective roof-control measures. Recommended are: wider use of roof-bolting, more complete safety training for all personnel involved in the production cycle, and added research.

Capital Expenditures

Q. What do you plan to spend for new equipment and facilities at both present operations and new mines in the next 5 yr?

An essential ingredient in developing new productive capacity and in raising tons per man is money. The level of expenditures, reflecting the activity on both these fronts, will reach a new high in the next 5 yr according to data on plans by the companies participating in the "*Coal Age* Study of Industry Planning."

Deep Mines—Deep producers mining 109,208,000 tons in 1956 expect to spend $187,750,000 for equipment and facilities to expand output at present mines and open new mines in the period 1956-60. The peak is this year, with a total of $58,148,000 or at a rate of 53c per ton of expected 1956 output. The level in 1957 is $52,618,000.

Strip Mines—Companies producing solely or predominantly by stripping and expecting to mine 52,630,000 tons in 1956 plan expenditures of $85,600,000 for new equipment and new mines in the next 5 yr. Heaviest spending, $33,500,000, is scheduled for this year. At a rate of 64c per ton of current output, the strip rate is 21% higher than the deep rate.

All Properties—Reporting deep and strip producers indicate that they plan to spend $273,350,000 in the period 1956-1960. Most of this total, $162,191,000, is scheduled for 1956 and 1957 ($91,648,000 in 1956 and $70,543,000 in 1957). Lesser figures for the following years are shown in the accompanying table, since many companies had not firmed up their ex-

Anthracite: 1956-60

HARD-COAL COMPANIES accounting for over one-fourth of 1956 anthracite tonnage report that they will spend $5,450,000 on new equipment and facilities in the period 1956-60. Of this amount $3,700,000 is slated for existing operations; $1,500,000 for opening one new mine in 1956-57; and $250,000 for reopening four mines (now closed) in 1956-57.

Low capital spending and high supply cost—at the rate of 20c and $1.04 per ton, respectively, in 1956—reflect largely the unsettled or uncertain state of most of the anthracite industry. One producer says: "The immediate future for anthracite is not good, industry-wide. However, the long-range future should be fair to good." Another company mining deep comments: "Anthracite (now producing about 25 million tons annually) will continue to decline an average of 5% per year for 5 yr." Only in strip production, which accounts for one-fourth of total industry tonnage, are there signs of promise. The one strip producer reporting sees "a very optimistic future."

Anthracite, of course, has been and still is plagued with mining problems which make reduced costs and increased production efficiency extremely difficult. The weighted average output per man-day for deep anthracite mines reporting is 3.4 tons and only a slight change to 3.7 tons is indicated during the next 5 yr. One of the deep producers puts mining problems this way:

The major problems are "geological conditions restricting the use of mining machines. Openings into and in mines are not designed, either by heights or widths, to accommodate modern mining machines; nor are the track gages suitable; the correction of which, if at all possible, would require tremendous expenditures."

To remedy anthracite mining problems, this producer asks for "experimental work in longwall equipment and experimental work in 'off-track' equipment which will climb heavy grades." A second company suggests the development of "new mining and loading machines for low-vein second mining in anthracite veins." A third producer calls for "an entirely new breaker design to eliminate the multitude of machines in the existing breaker." The strip anthracite company wants "larger stripping equipment."

penditure plans that far in advance at the time of the survey. The timing and magnitude of new capacity, for example, are normally more easy to decide on than how much money will be involved and over how many years it will have to spread. Therefore, the figures for the years after 1956 will have to be revised upward—probably to levels higher than those of 1956-57. This is in line with McGraw-Hill's experience in surveying plant and equipment expenditures in times of an expanding economy.

Industry Total—Over all, bituminous deep and strip producers contributing data to the planning study are spending at a rate of 57c per ton of coal produced in 1956. These include most of the larger and more-active organizations, which available data indicate tend to spend at a somewhat higher rate. With this in mind it is conservatively estimated that the bituminous industry will spend $250 to $260 million for new plants and equipment in 1956. In view of plans drawn up for the next 5 yr, and also in view of the fact that the following 5 yr will witness a further expansion in coal demand, it is expected that this level of expenditures will increase. In fact, at going rates for opening new properties, as well as for expansion and modernization, it will have to increase if the industry is to meet 1960's capacity and tons-per-man goals. Thus, the bituminous total for 1956-60 will hit $1½ billion or higher.

Supply Costs

Q. What is your cost for operating materials and supplies per ton of coal?

Current weighted average supply costs, on the basis of data supplied by the reporting companies, are as follows: deep bituminous, 88c, ranging from a low of 30c to a high of $1.60; strip bituminous, 79c, ranging from a low of 32c to a high of $2.20.

The average for all types of mines comes out to 85c for 1956. This compares with previous figures collected by *Coal Age* at intervals going back to 1929, when the average was 20c per ton, dropping to 14½c per ton in 1932. In the latest previous year for which data were collected (1947) the rate for materials and supplies was 56.2c per ton.

Production Methods

Q. Do you anticipate important changes in mining or preparation methods at present properties? At new properties?

The most important change coming up in mining methods will be greater use of continuous miners. This was listed by the majority of strip companies replying, as well as the deep organizations, indicating that stripping companies will go more into deep mining. Incidentally, the replies also show the reverse, with more deep-mining companies planning to go into stripping. Additional preparation facilities at existing plants are reported by nearly half of the producers contributing to the study.

The Industry Outlook

Q. What is your personal opinion of the coal industry's future?

Virtual unanimity in forecasting a good future for the bituminous industry was registered by the executives of companies contributing to the *Coal Age* planning study. They see a firm, rising demand for coal, primarily as a result of growth in the utility, steel, general industrial and export markets. Converting this demand into sales, however, will not be automatic. It will depend on how effectively the industry and individual producers will be able to . . .

1. Mine and transport quality coal cheaply.
2. Attract investment capital.
3. Improve merchandising methods.
4. Push research on markets, equipment and mining techniques.

Individual comments included the following:

- Export markets will continue to be good and the requirements for steam and metallurgical coal will continue to increase. These markets will be served by mines which are in a position to properly prepare their product and have favorable transportation costs, in addition to favorable mining costs.
- Very good with increasing energy requirements over the long-range future.
- Good but not automatic. We will gain in markets in proportion to the amount of thought and time we give to improving both sales and operational methods and the money we devote to research development.
- The future of the industry is excellent but realize there will be no let up in competition from other fields, nor in labor demands and high railroad rates which continually rise.
- Bright for low-cost mines only.
- We are experiencing a very real increase in volume and price and find heavy industry and power companies are planning their future largely in terms of coal. This company is very optimistic about the coal industry's future.
- Bright, provided the industry can find a way to pay for the ever-increasing cost of facilities required to meet the increasing demand. To a large extent, decreased costs derived from improved methods and equipment have been passed on to the consumer and the railroads. The forward movement predicted for coal will fall flat on its face if this can not be accomplished.
- The outlook for the operator with efficient operation and well-prepared coal of good quality is very good.
- In general, the coal industry is gaining. However, it is still losing markets. I believe we will continue to gain slowly but the future will be in two fields only: cheap steam coal (near water) and high quality (also high cost) metallurgical coal.
- Coal must be mined cheaper. Industrial and steam coals should enjoy a good future.
- Eastern mines having coking as well as straight bituminous coal have a much greater chance of survival than those mines in the west which have coal only for domestic and industrial markets. Most of our market is with coal power plants but we could not operate on power coal prices without a large domestic market, now threatened by natural gas coming into the northwest.
- The outlook for the coal industry is bright, providing, however, that the increased cost of production plus other increased costs do not make our product prohibitory. I have in mind unreasonable labor increases, supply cost increases, and an unrealistically high freight rate.
- The outlook appears good, but people must realize that the marketing problem is changing and that quality is becoming a factor.
- We think the coal industry's future is very bright, due to the expected increase in the consumption of coal by the electric utilities, the steel industry and the export market. In our opinion, the estimate of total production requirements in the United States of 736 million tons annually by 1965 is conservative.
- The use of coal in electric power generation will make a considerable increase in the demand for coal in the very near future. This demand, along with consolidation of smaller companies into bigger companies and the industry's trend to mechanization, makes a bright future for the coal industry.
- Optimistic, particularly beyond the next three to five years.
- The future is bright with increased consumption of coal by electric utilities and expanding export markets.

The Coal Commentator

Bigger and Bigger

The advent of bigger, more-powerful and higher-capacity equipment usually follows not too far behind the discussion of the possibilities. On that basis, the advent of the 100-ton coal hauler and the 100-yd shovel is not too far off. In fact, the industry is two-thirds of the way there in haulage and nearly two-thirds in shovels, which is not to say that the next third will require no more effort than the previous two. The reverse is, in fact, the case, since the next step is always much harder than the last in equipment development. In line with this principle, a great deal of work in increasing engine horsepower, in improving steels and in designing mechanical parts to stand the gaff preceded the latest examples of heavy-duty haulage units for use in southern West Virginia: the 70-ton Kenworth-Marion jobs for Beckley Coal & Coke and the 68-ton Euclids for Bolt Mining.

How much further the drive for capacity in coal-mining equipment will go still cannot be foretold, but it will continue as long as the pressure for cost-reduction exists and the new units will provide an overall saving. The opportunity for using really big machines is less in deep mining, but within space limitations, size and capacity will continue to increase, while remote operation undoubtedly will become a fairly common practice. Some of the world's most amazing machines will be found in tomorrow's coal mines. In fact, coal has some in that class right now.

No Letup

With a bigger and growing stake in the heavy-fuel market, coal naturally is increasingly concerned with anything that might lead to more competition in this market from other fuels. Residual oil has given the industry a bad time in the past and could again if (a) the refining industry decided to increase its output of the heavy fuel fraction and (b) decided to cut prices or dump. Since the first could be the trigger for the second, it becomes a matter of interest when representatives of one of the largest importers of crude and products, including residual, declare that their organization will maintain its present high heavy-fuel percentage, and note in addition that the trend toward reducing heavy-fuel output elsewhere in the industry seems to have been arrested and, in fact, may have turned slightly the other way.

When oil is properly priced, coal has a clear margin. As an example, the Anthracite Information Bureau has recently released data on costs of heating two modern high schools in Philadelphia with No. 6 oil and barley anthracite. The cost per pupil per year, 1955-56 season, was $4.60 with oil and $3.81 with anthracite. Both schools are practically identical in size and construction. But oil still has glamor, along with gas, and it could again try dumping to buy markets. This is not to say that dumping is likely, but if coal is to maintain and strengthen its position in the heavy-fuel market it must continue to bear down on cost and service.

Fish, Too

A few years ago, a picture of a passel of fat, healthy pigs gobbling up coal got a big play in the newspapers and magazines not only in the United States but almost all over the world. The pigs belonged to Byron Somers, then and now superintendent of Truax Traer's Red Ember mine, at Fiatt, Ill., and the man who first proved the practicability of grazing cattle on strip banks. The picture got such a big play because most people find it almost impossible to believe that anything would eat coal, even though pigs have been doing it almost since there were pigs—and coal. Now, fish are getting into the act—that is, if a news story from the anthracite region is to be taken as an indication. A 16-in rainbow taken from Mehoopany Creek, so the story goes, had three pieces of anthracite, about pea size, in its middle. Maybe the German who says he can produce a full meal from coal has something after all.

Footnote on Exports

Two British collieries—one being built and one that has reached the ripe old age of 124 yr—provide the basis for this month's footnote on export prospects. The new colliery is Rothes, in Fifeshire. Construction started in 1946. One shaft already is over half a mile deep, and it is expected that production will begin about the middle of 1957. By 1966, it is hoped that 2,500 men will be producing 5,000 long tons per day. The old colliery is South Hetton, in Durham, which established a new one-day production record in July of 2,019 tons with 950 men.

These two examples indicate to a considerable degree the difficulties which beset foreign coal producers, particularly in England and on the Continent. Output per man is low, mining conditions make major increases in productivity difficult to achieve, and new mines are extremely costly not only in money but in time required for construction. **As its economy grows, therefore, Europe will have to continue to depend on imports, and the U. S. will remain the only logical source, since it is the only country with the necessary low-cost producing capacity.**

Relief Ahead?

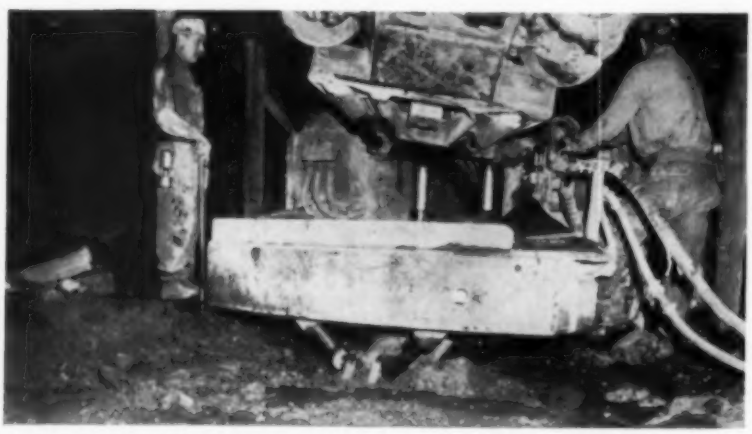
If the recommendations of certain railroads are accepted and put into effect, the freight portion of the carriers' business, of which coal is a major fraction, will be relieved of the burden of passenger deficit. Some say that it will be the death knell of the first-class passenger trade, which may or may not be a pessimist's view. But if it comes to pass it will mean welcome relief for coal and other freight shippers.

OPEN-END PILLARING with a single-operation mining machine, protected by breaker cribs and adequate timbers, results in increased productivity and minimum manpower requirements at Isabella mine, National Steel Corp.

Open-end pillaring with continuous machines at Isabella leads to . . . .

High Tonnage With Small Crews

Actual operating time for face machines is at a maximum, even though extensive roof-support work must be done, because service functions are made more efficient through careful control.



HYDRAULIC "KANGAROO TAIL" at rear of miner chassis snubs machine against face and reduces frame vibration while head cuts.

SMALL CREWS using continuous-type mining machines are achieving higher productivity in pillar-recovery operations at Isabella mine, National Mines Corp., a division of National Steel Corp., Isabella, Pa. The record shift to date shows an output of 446 tons of raw coal produced by three face men using one of the two Lee-Norse Miners now in service at Isabella. The crew of each Miner consists of an operator and a helper and a shuttle-car operator, under the supervision of a face foreman. While the average productivity is less than half that of the record shift, primarily because of the timbering that must be done, the new methods have made a substantial contribution to increased efficiency at Isabella.

The mine, which was opened in

ADHERENCE TO APPROVED ROOF-SUPPORT PLAN, using combination of steel jacks, cribs and timber sets, and rapid extraction of coal result in better falls in gob area and relief of pressure on remaining pillars along break line.

1909 and acquired by National Mines Corp. in 1929, now is in full retreat. Six mechanized-mining units are at work in pillar sections, including the two Lee-Norse units and four equipped with track-mounted Myers-Whaley loading machines.

OPEN-END PILLAR RECOVERY

Development openings originally were driven 12 ft wide on 115x86-ft centers in the 7-ft-thick Pittsburgh seam. A representative seam section shows the 7 ft of coal overlain by a 12-in layer of drawslate and from 3 to 10 in of "wild" coal. The main roof consists of a 7-ft layer of gray shale with standstone over that. Total cover averages 450 ft. A thin layer of hard slate lies immediately below the coal and under this is from 2 to 4 ft of fireclay. Trouble with bottom-heaving can result if excessive roof pressure is permitted to develop on the pillars.

With conditions like these, it is the practice at Isabella to extract the full seam to eliminate the difficulties of trying to hold the drawslate. Furthermore, the pillars are worked open-ended or with only a thin fender against the gob to insure good roof breaks and, consequently, relief of pressure on the pillars. Incidentally, the retreating pillar line is at right angles to the entry, Isabella being among the first mines in the region if not the first one, to employ a flat pillar line.

In the sections newly equipped with the Lee-Norse Model 50 machines, the 17-ft-wide pillar lifts are made in two passes of the machine, which mines an 8½-ft wide opening head-on sumping-in at the top and cutting downward. The loading rate is

SINGLE SHUTTLE CAR transports coal to 10-ton mine cars. Record shift so far is 446 tons in 5 hr actual operating time with a 3-man face crew.

DISCHARGE STATION is equipped with car-spotting hoist which is controlled by shuttle-car operator through pullcord switch, as shown.

ROOF SUPPORT is inspected by Superintendent McLellan to insure maximum safety for operator before mining machine begins new pillar lift.

ROOF-BOLTING CREW employs stoper, dust collector and track-mounted compressor (below) at intersections and loading points ahead of pillaring crew.

calculated to be about 4 tpm. The head is fitted with 80 Vascoloy-Ramet cutting bits.

Preparations for taking a pillar include the erection of a bridge timber along the rib at the point where the lift is to be opened and the erection of cribs along the open end to provide further protection for the operator and the machine and to promote the desired roof breaks. In situations requiring more than this normal amount of timbering, extra service laborers may be assigned to assist the face crew in preparing the place. In most instances the head of the mining machine is used to raise timber against the roof and hold it there while the posts are set.

Timber supplies are hauled to the shuttle-car discharge station on special 8-wheel Differential Steel trucks 16 ft long. The timber-supply trucks are loaded on the surface and spotted near the discharge station by the swing motor. Usually, supplies remaining on a truck when a new truckload arrives at the section are returned to the surface, since the need for storing such supplies in the section is minimized through careful scheduling of supply deliveries. This leads to improved housekeeping underground.

TWO-PASS MINING

Isabella's approved minimum timbering plan requires crossbars not more than 8 ft apart. Since the sumping action of the Miner consists of simply tramming the machine forward into the face, this 8-ft advance is made in three or four cuts. The machine then is withdrawn and maneuvered to make another 8½-ft-wide cut alongside the first one. When the 8-ft advance is made in this second cut, a crossbar is raised against the roof and held there while the helper installs a prepared post under the end of the bar on the clear side and a steel jack under the other end alongside the mining machine. The steel jack is set in far enough from the end of the crossbar to permit later installation of a wood post in place of the jack. With the timber in place, the Miner proceeds to make another 8-ft advance on the same side. Thus, for each move of the Miner from one side to the other a 16-ft advance is made.

Only the Miner and a Joy 10-SC shuttle car are employed in the newer trackless sections. The 10-SC discharges into 10-ton Differential Steel mine cars which are moved past the loading point by a Joy car-spotting hoist. The hoist is controlled by the shuttle-car operator.

Formerly all seven mechanized

units were equipped with Myers-Whaley loading machines. Now with only four such units actively producing coal, some of the extra machines have been retained to be used outby the continuous-mining sections, cleaning up fallen material to prepare for later mining of the pillars by the new machines. A crawler-mounted Myers-Whaley will soon be in service to do this work in openings where the track has been removed.

In further preparation for pillaring, roof bolting is done at main intersections and loading-point locations. The two-man bolting crew is equipped with a track-mounted Acme compressor and dust collector, a Cleveland stoper and an impact wrench.

SERVICES AT ISABELLA

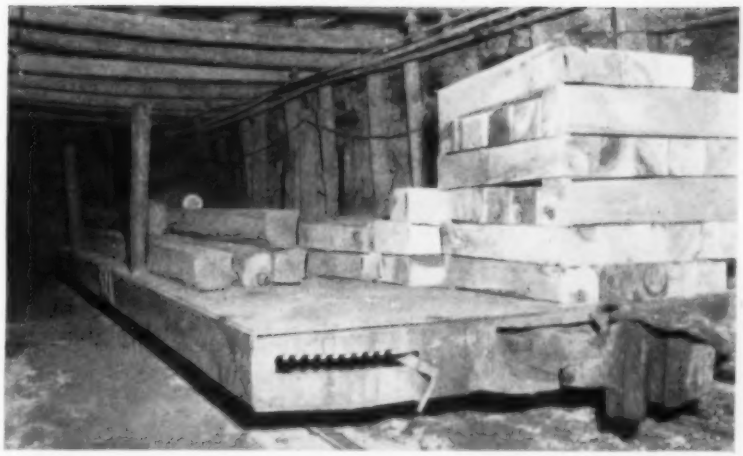
Swing motors serving the mining units are 15-ton Jeffrey units. Main-haulage power is provided by a tandem of two 13-ton locomotives and by a 28-ton, 8-wheel General Electric locomotive powered by four 120-hp traction motors, one on each axle. The cars are hauled to a rotary dump at the foot of the slope to be dumped into the slope-belt feed hopper.

The Lee-Norse machines operate from the power-distribution system existing at the mine without requiring any increase in circuit capacity. Face voltage generally is about 280 v, which is a reflection of Isabella's investment a few years ago in a high-capacity, fully sectionalized DC power system. In fact, Isabella was the pioneer in installing a sectionalized system employing I-T-E circuit breakers for fault isolation.

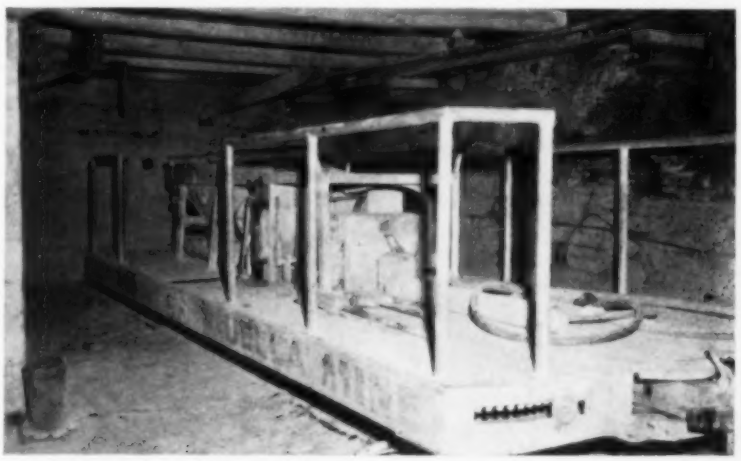
Rockdusting is done at the active faces with MSA Bantam machines and in the main and back entries with a truck-mounted high-pressure rock-dusting machine. The truck on which the high-pressure unit is mounted also provides space for storage of bagged rock dust and other supplies for maintenance of the openings. This service unit is shown in an accompanying illustration.

In addition, Isabella officials were pioneers in the development of mechanized timbering. Working with engineers of the Greensburg Machine Co., the mine officials developed a successful self-propelled unit for sawing and raising heavy roof supports more efficiently.

Operating management at Isabella is headed by G. M. Rigg, vice president in charge of operations, and G. N. McLellan, mine superintendent. G. M. Raymond is mine foreman; G. L. Kemp is maintenance superintendent, and E. J. Sandy is mining engineer.



TIMBER-SUPPLY TRUCKS in the working section provide a convenient source of roof-support materials and materially improve housekeeping.



ROCKDUSTING in main openings and back entries is done from this specially-equipped car which provides room for hauling rock dust.

COMPLETE SECTIONALIZATION of DC power system according to USBM standards is an Isabella "first." Faults are isolated to a single section.

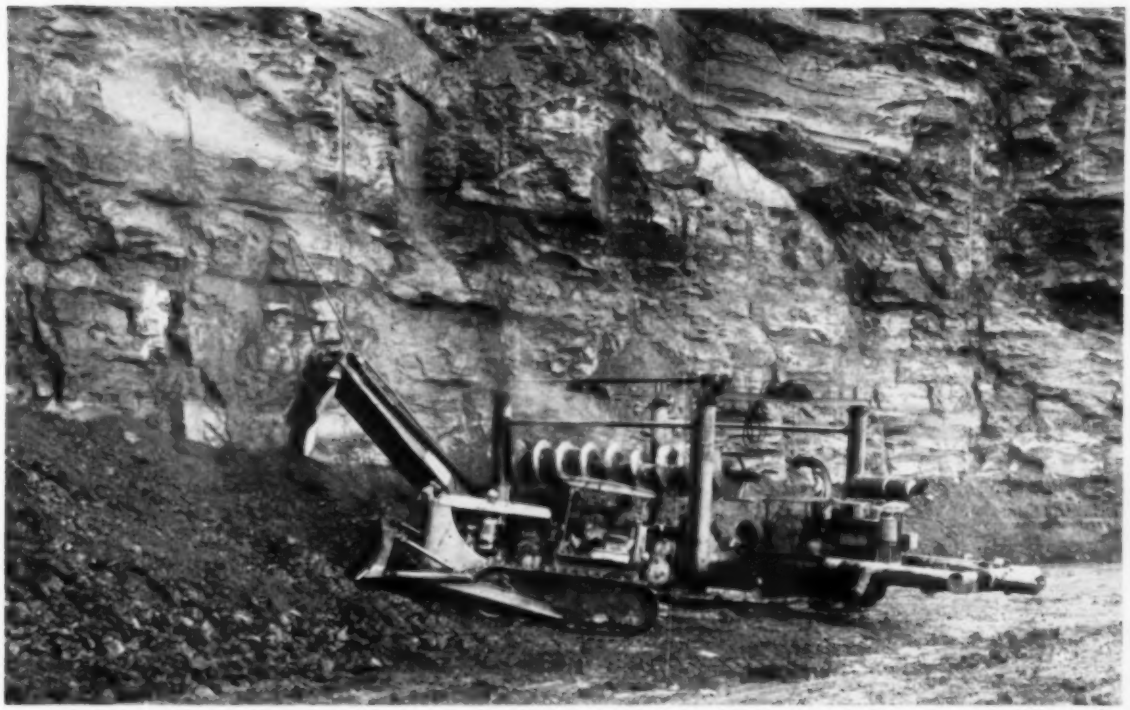
MOUNTAIN-TOP STRIPPER works at an elevation 2,700 ft above sea level while removing overburden in 19-cu yd bites at Truax-Traer's Marfork mine. Unit works in 115-ft wide pit, casting blasted material over hillside without rehandling.

Stripping and Augering Giants

DEEP BLASTHOLES at back of cut are drilled 55 to 60 ft deep on 14-ft centers from drill road cut by bulldozer.

LOWER-LEVEL DRILLING is handled by another vertical dry-type unit that bores 6¼-in holes on 20-ft centers.

Three-level drilling and blasting prepares 115-ft strip of overburden



HIGHWALL AUGER, operated by three men, bores 48-in holes into coal seam after stripping is completed. Average output from the auger is 400 tons per shift. Coal is stockpiled until shovel can be conveniently moved in for a shift.

Work on Rugged Mountain Top

EXTRA CAPACITY is provided by vertical auger-type hydraulic machine.

for 19-cu yd stripper

HIGH ON A MOUNTAIN TOP, 10 winding miles from the mining community of Marfork, Raleigh County, W. Va., a 900-ton giant is tearing off the hilltops to recover the Dorothy seam of coal. Towering 85 ft above the ground, the electric power shovel chews up blasted rock in 19-cu yd bites at the Marfork mine of the Truax-Traer Coal Co. while uncovering a 115-ft strip of coal. After the coal is uncovered, it is loaded by a 3½-cu yd shovel. Then a giant coal auger bores 48-in holes 150 to 180 ft deep into the coal exposed along the highwall. Any coal that these two giants cannot reach is recovered by deep mining methods. Total output from the triple operation is 2,800 tpd, with 52% coming from stripping, 30% from deep mining and 18% from augering.

A 19-cu yd stripping shovel usually does not cause a lot of excitement in flat country, but when it has to be hauled up a mountain piece by piece over twisting roads carved out of the mountainside it is unusual. The big Bucyrus-Erie 750B shovel was shipped on 30 railroad cars to its present site from Illinois where it had been in service at another Truax-Traer operation. It took nearly 3 mo to reassemble the machine and make certain modifications.

Since Truax-Traer has more than 7 yr work at the present site, management felt justified in moving into the mountainous area. The shovel works to banks 75 to 80 ft high while uncovering the 115-ft strip of Dorothy coal. The coal outcrops at an elevation about 2,700 ft above sea level and averages 9 ft in thickness. However, a 21-in band of rock splits the seam 30-in from the bottom.

Immediately over the coal there is a 6-ft bed of sandstone. Other deposits in the overburden include a mixture of shales, thin coal beds and occasionally sandstone layers. The coal is underlain by fireclay.

DRILLING AND BLASTING

To prepare the way for drilling the overburden on the 115-ft cut, a Caterpillar D8 bulldozer cuts three drill roads parallel to the outcrop. A Winter-Weiss Portadrill mounted on a GMC truck sinks 6¼-in blastholes on

20-ft centers along the two lower roads. A Stardrill-Keystone unit, mounted on a Dodge truck, bores 7⅞-in holes on 14-ft centers on the upper road. However, spacing of holes is flexible and may vary between 14 and 20 ft, depending on the hardness of the rock. All blastholes are drilled to the top of the coal. The company also has a McCarthy hydraulic auger-type vertical machine to supplement the two other units when extra drilling is needed.

Holes on the top bench are an average of 55 to 60 ft deep. Explosives are distributed in two zones in the drillholes. First, eight 5x24-in cartridges of Nitramite and a 7x10-in primer of Red Cross 40% dynamite are placed in the bottom of each hole. Then stemming is added to within 27 ft of the top. This is topped with four more cartridges of Nitramite and another primer. Stemming is added to the top of the hole.

Holes in the second bench also are deckloaded. Six cartridges of 5x24-in Nitramex are placed in the bottom of the holes. Stemming is added to within 20 to 21 ft of the top and then 52 lb of 5x24-in Red Cross 40% dynamite is added. The remainder of the hole is filled with stemming.

Holes in the lower bench are charged with five cartridges of Nitramex and a primer and stemming is added to fill the hole.

All holes in the three benches are connected with Primacord and 9 m-s connectors are used between holes and rows. The lower bench is blasted first, followed in order by the second and third. Up to 60 holes are detonated at one time.

COAL DRILLING is done by vertical gasoline-powered auger. Holes are drilled on 6x6-ft squares. One man handles the drilling and blasting job.

How coal is blasted, loaded, hauled

DESTINATION for trucks is transfer station where coal is loaded into mine cars for 10-mi trip to headhouse. Shuttle car loads cars.

UNCOVERING THE COAL

The 19-cu yd shovel with its 90-ft boom and 60-ft handle works on top of the coal and is able to remove the overburden without recasting any of it. Since the machine is casting on a downhill slope and thus can drop the spoil well beyond the outcrop, there is no pile up of soil at the outcrop. Working around the clock 5 days per week, the 750 B moves an average of 7,000 cu yd per shift, or 105,000 cu yd per week.

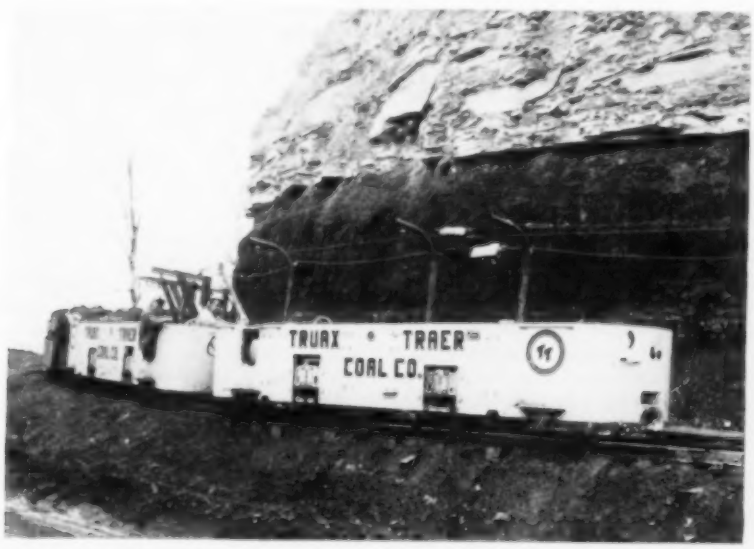
Power for operating the electric stripper is transmitted to the operating site by a combination of pole line and cable. Power is purchased from the Appalachian Electric Power Co. at 4,160 v and carried to the stripping area by an overhead pole line. The pole line is extended along the top of the ridge as necessary and a cable is tapped into the overhead line to carry power to the oil circuit breaker in the pit. A 1,000-ft section of cable leads from the circuit breaker to another 1,000-ft section of cable attached to the loading shovel. Thus the shovel can advance 2,000 ft before the circuit breaker must be moved.

LOADING AND HAULING

Fine, loose material missed by the stripping shovel is removed by a D8 bulldozer before the coal is blasted for loading. A wagon-mounted gasoline-powered vertical rotary auger drill is used to put down 2-in holes in the coal. Holes usually are drilled 6 ft apart in rows also spaced 6 ft apart. However, spacing is varied to meet the changing hardness of the coal. Blastholes are charged with 1½x8-in Monabel AAA and detonated with du Pont instantaneous blasting caps.

COAL LOADING into 18-ton trucks is assigned to 3½-cu yd diesel shovel. Unit also loads auger coal from stockpile built up along highwall.

at Truax-Traer's Marfork Stripping



BIG tandem locomotive is needed to control loaded cars on 10-mi 3% downgrade to headhouse. Units have air and dynamic brakes.

Coal is loaded by a Northwest 80D 3½-cu yd shovel powered by a Murphy diesel engine. Operating two shifts, the shovel takes the full 115-ft width of coal. A fleet of four 18-ton Mack trucks shuttle back and forth between the shovel and a transfer station where coal is loaded into mine cars. The mine track and transfer station are advanced periodically so that the truck haul never is more than 2 mi.

Coal is fed from the hopper to Bonnie Floyd and Enterprise 6-ton mine cars by a beefed-up Joy 6SC shuttle car having dual conveyor motors and a heavy-duty conveyor chain. To permit fast changeover to a new loading station, a new hopper is built at the new loading site before it is needed and a spare shuttle car is placed in position under it. Mine cars are handled at the loading point by a Sullivan mine-type car-spotting hoist.

From the time the coal leaves the transfer station, it travels downhill 10 mi to the headhouse. Loaded cars are first hauled 2 mi to the sidetrack in 25-car trains by two 13-ton Jeffrey locomotives in tandem. There they are picked up by a tandem locomotive made up of either two 18-ton Jeffrey or two 25-ton General Electric units and taken 8 mi to the headhouse. Since the road to the headhouse is downgrade at 3%, control of the trips is a problem. Truax-Traer solves the problem by placing skids under the cars for the entire distance to the headhouse. Skids are changed three times during the trip. Additional hold-back power is supplied by dynamic and air brakes on all locomotives.

AUGERING

Truax-Traer uses a Compton 48-in highwall auger with a 48-in cutting head to recover coal beyond the stripping limit. A single row of holes, spaced on 6-in centers, is drilled in the upper portion of the coal bed above the rock parting. Holes are drilled 150 to 180 ft deep. Where the seam thickens or the rock parting thins or is lower in the seam, two holes are drilled in the coal to increase the percentage of recovery.

Coal from the auger is discharged onto the ground adjacent to the highwall. When a good size stockpile has been built up, the coal-loading shovel moves in at a convenient time and loads it.

Three men perform all of the duties connected with augering. One man uses a Caterpillar D8 bulldozer to move the auger to new drilling sites and to clean the pit and road in the augering area and keep the stockpile compact. The other two men operate the auger and add or remove auger sections. Average output from the auger is 400 tons per shift. Augering is done only on the day shift since the operation covers as great a distance in one shift as stripping does in two. Thus the two operations are kept in balance.

MANAGEMENT

All of Truax-Traer's West Virginia mines are under the direction of H. M. Tibbs, general manager, who has headquarters at Kayford, W. Va. Other members of the management team are: M. H. Shumate, assistant general manager; J. Q. Berta, general superintendent; W. R. Cuthbert, chief engineer; Ben Henry, superintendent; E. L. Maxwell, strip foreman; Harry Maddix, night foreman; and Darrel Harden, drill foreman.

ROUTINE MAINTENANCE is only one phase. Productive maintenance also includes inspection, repair, overhauling and counseling on equipment purchases.

"If the coal industry simply follows the average trend of American industry, maintenance expense in the next 10 yr is expected to double. This is brought about primarily by the increased use of equipment to meet growing production demands and to lower unit cost. The fact that the maintenance budget is going to increase faster than all other expense items, and will assume a larger share of coal cost, is a big reason why profits are directly affected by maintenance."

Productive Maintenance

By R. T. BLAKLEY, Sales Engineer
General Electric Co., Salt Lake City, Utah

COAL OPERATORS in the past few years have demonstrated their faith in the coal industry by making heavy investments in mechanical equipment. It would seem that the evolutionary changes in mining brought about by mechanization are now well enough established for management to expect a fair return on the investment.

If the modernization of your mine is not as successful as it should be, perhaps the reason lies in your maintenance operation. In other continuous-process-type industries such as, electrical manufacturing, steel, textile and paper, experience shows that the difference between profit and loss is governed by effective maintenance.

Does it seem that maintenance in your mine is applied on a "put-out-the-fire" basis or is it scheduled at a time most convenient to production? Production can and does increase with scheduled maintenance.

In many industries the effectiveness of a maintenance department is measured directly by the number of breakdowns as well as maintenance expense in relation to product cost. The true cost of downtime in your mine, both direct and indirect, should be a major factor in setting up a maintenance budget.

A true evaluation of downtime cost should include such items as value of lost production, idle time of all production workers involved, fixed overhead charges—all in addition to the direct material and labor cost of repairs.

Downtime expense is only one profit-nullifying result of an inadequate and out-of-date maintenance program. For example, you probably would have considerable difficulty in raising funds to replace the underground equipment that you purchased in the last 3 yr. Protection of this original equipment investment by maintenance is vital to your long-range operation. In this respect maintenance could be considered as equipment insurance.

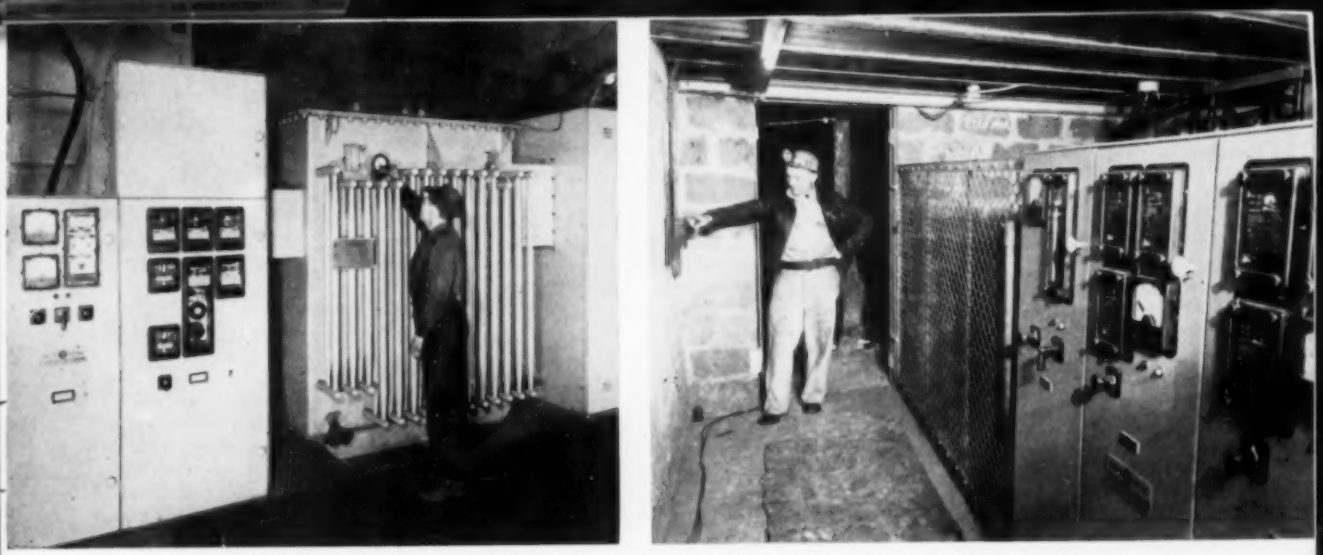
Effective maintenance today is not simply a matter of increasing the maintenance budget, nor does it come automatically with the purchase of a new machine. Maintenance has this purpose: To increase production and lower cost. Too elaborate a maintenance program can result in expense that exceeds the saving.

Unfortunately, no set rules exist for formulating a good maintenance program that will apply to every type operation. There are certain fundamental principles, however, that must be applied in every mine, because such principles are based on sound economics. Furthermore, these principles are not new, they have been tried and proven in other continuous-process-type industries.

To apply the principles properly you will need to devote to maintenance the same skill and ingenuity and investment in equipment that has gone into today's improved production techniques. Of fundamental importance to the successful application of these principles is management's thinking about maintenance in the light of modern mining practice. The pre-war concept of maintenance being a necessary evil and purely an expense item is as obsolete and costly as the pick and shovel. Maintenance today should be thought of in terms of production; productive maintenance is a positive rather than a negative thing. It doesn't just prevent something, it produces. It doesn't mean added operating costs, it means added profits.

To move from ordinary maintenance to productive maintenance, just five simple steps are needed:

1. Gather complete equipment data.
2. Evaluate for routine maintenance.
3. Establish a routine operating-control system.
4. Evaluate to determine which ma-



SCHEDULED INSPECTION of power-distribution equipment and other critical units in which an outage can shut down the mine is a productive-maintenance step to head off trouble. Fan drives and haulage units are other critical items.

chines require critical maintenance.

5. Establish a critical maintenance program.

Let's look at the steps in a little more detail.

1. COMPLETE EQUIPMENT DATA:

The key to successful productive maintenance is, and always will be, an effective record system.

The very first step in developing a good record system is to gather complete equipment data. Track down every machine, every moving part in your mine, and get the pertinent facts down on paper. Obviously, you must know what you have and where it is before you can maintain it. The need for such a survey may seem self-evident to most but it's surprising how many maintenance people do not know the exact number of their machines and their locations. Incidentally, these data may serve for many other purposes such as plant property records and for tax and insurance purposes.

EVALUATION
2. ROUTINE MAINTENANCE

Now that equipment has been surveyed and all pertinent data recorded, the next step is to determine the importance of each machine. Should you or should you not spend time and money keeping every one of them running? Remember, you are interested in maintenance which makes money for you—not simply oiling and greasing everything that moves. Will you incur major loss in time, production and dollars if the machine breaks down? Or will it be just an inconvenience, like the breakdown of a water cooler? In some instances, repair and/or replacement costs less than routine maintenance.

3. ESTABLISH ROUTINE

This is the heart of your productive maintenance operation since proper control of breakdowns is based on routine maintenance and inspections. The record-keeping need not be complicated. In fact, it consists basically of keeping only the following three file cards up to date:

1. The equipment record card, on which you will keep pertinent data including catalog number of renewal parts stocked.

2. The inspector's removable card which schedules the inspection cycle. On this card also the maintenance inspector records work to be performed.

3. Maintenance repair and replacement record card, on which is noted work that has been performed.

All these cards are kept together conveniently and permanently in a file cabinet.

Since this step is critical to successful conduct of the productive maintenance program, it is worthwhile to take a case history, say a mine fan motor, and trace the paper work required to assure its continuous operation.

On the day the fan is put into operation complete equipment data, service conditions, etc., are recorded on the equipment record card. The location and department responsibility for the motor, together with motor-applications information, also is recorded. On the same card is entered the cost of the motor, date of installation, and name of manufacturer. Also, because this motor is to receive routine maintenance, the catalog numbers of stocked renewal parts are entered.

Next, the inspector's card is prepared and here again description of motor, nameplate data, location, etc., is entered. This is the work card the inspectors will use in making regular maintenance checkups. Consequently it has a reminder "tickler tab" to signal when an inspection is due. After making a scheduled inspection of the motor the inspector records his findings on this card and returns it to the maintenance clerk.

If repairs of some sort are necessary, the maintenance clerk initiates a work order to take care of the repair. The work order is returned to the clerk after repairs are completed so that a complete report of repair and cost can be entered on the third card—the maintenance and repair card. This record of upkeep cost is really the payoff record in productive maintenance. A quick review of maintenance and repair cards will let you know almost at a glance which if any equipment is being misapplied and misused or is uneconomical to operate.

Inventory control should also be the responsibility of the maintenance department. The first requirement of a good renewal parts system is that money invested should be working to best advantage. The carrying cost, stock turnover and cost of acquisition should all be considered in arriving at an economical stock balance.

One suggested way to control inventory is to classify stock. For example, our General Electric service shop, after a stock analysis, divided stock into three classifications:

Class A, representing 10% of the items and 70% of investment. On these items we try to calculate very closely the minimum stock and most economical ordering quantity. Our obvious intent, of course, is to keep investment low and turnover as high as possible.

Class B, representing 50% of the items and about 20% of investment.

Here we can relax control a little and carry a somewhat larger buffer stock.

Class C, representing 40% of the items and about 10% of investment. These items require very little control except to maintain ordering on a 6-month basis and keep a 10-week buffer stock on hand at all times.

The second requirement of a good inventory system is that parts and materials be available for routine maintenance and repairs. To achieve this effectively and conveniently, you need some kind of a record procedure, keeping these objectives in mind:

1. Obtain optimum turnover rates on all items.
2. Prevention of overstocking and understocking.
3. Avoidance of obsolescence losses.
4. Relation of stock quantities to demand.

There are many good stock and inventory record systems providing detailed information available from vendors to help you realize these cost-saving objectives.

4. CRITICAL MAINTENANCE EVALUATION

The importance of a machine may be gaged fairly accurately by asking yourself these questions:

1. Will the failure of the machine stop production?
2. Is there much capital invested in the machine?
3. Will failure endanger the health or safety of employees?

If the answer to any of these questions is yes, it should be considered a critical unit; therefore deserving of the best maintenance possible. A shuttle car, ventilating fan or haulage locomotive falls in this category.

One of the first actions to take on any critical machine is to determine its present condition.

There are recommended electrical tests that can be applied. Visual inspections quite often can determine obvious faults. Failures can also be predicted through attention to noise, vibration, loose parts, high temperature, etc. Improper ventilation is emphasized when you realize that a temperature rise of 8 deg over machine design temperature may cut winding life in half.

Most mines recognize the value of planned or scheduled overhauls of face production equipment, but is such attention given to ventilating fans, locomotives, conveyors, tipple equipment, etc.? These critical units also can shut down a mine.

5. CRITICAL MAINTENANCE

When and how much of a planned overhaul is required should be based on economics. The unit maintenance and repair record card will prove invaluable. It not only gives a written record of when the machine was last overhauled but a running account of the frequency and extent of subsequent breakdowns. Also, this same card should show production time and value lost due to the failure of this machine.

Analysis of this information will indicate whether you must immediately schedule for planned overhaul, or whether you are justified in using the machine without overhaul, based on the probability of failure. Note that without simple yet complete maintenance records a profit making study such as this would be time-consuming or perhaps impossible.

In some instances you will find it relatively inexpensive to have a complete spare unit. In other cases, it might be wise to prepare an evaluation for each critical machine.

Having determined from such an analysis which parts will give you the most economical protection in terms of production insurance for the investment, you should adopt a critical maintenance program. Order spare parts as a long-term investment, keeping in mind that in the event of an unexpected breakdown days are saved by having the right parts available. A good example of this might be stocking a complete motor assembly, instead of spare coils only, for a shuttle car or locomotive.

The few minutes required to replace a complete motor as compared to the hours of lost production involved in rewinding might easily justify the added stocking expense.

MANPOWER AND MAINTENANCE

When we talk about maintenance we also are talking about people. Since the successful implementation of a productive maintenance program in your mine will depend on people, you will find the following suggestions helpful.

In most operations we no longer have the jack-of-all-trades. Today's equipment is too complex for him. It requires men who are trained specialists. And because it does, the organization and responsibilities of the maintenance group should be clearly defined by management to avoid inefficiency and dissension between departments.

Basic responsibilities of the maintenance group will be essentially the same in all mines. They are as follows:

1. Inspections.
2. Inventories.
3. Routine maintenance of equipment.
4. Planned overhaul of equipment.
5. Major repairs.
6. Equipment transfer.
7. Building and ground maintenance.

These responsibilities also include supervision of power distribution, and counsel and guidance in the purchase of new equipment.

Having the maintenance group and production group responsible to the same level of authority has worked well in many of our factories. It puts maintenance where it belongs, on an equal level with production, and it allows the two operations to be considered impartially, each on its own merits.

MAINTENANCE TRAINING

As equipment becomes more complex the necessity for better trained maintenance men at the "do it" level becomes more urgent.

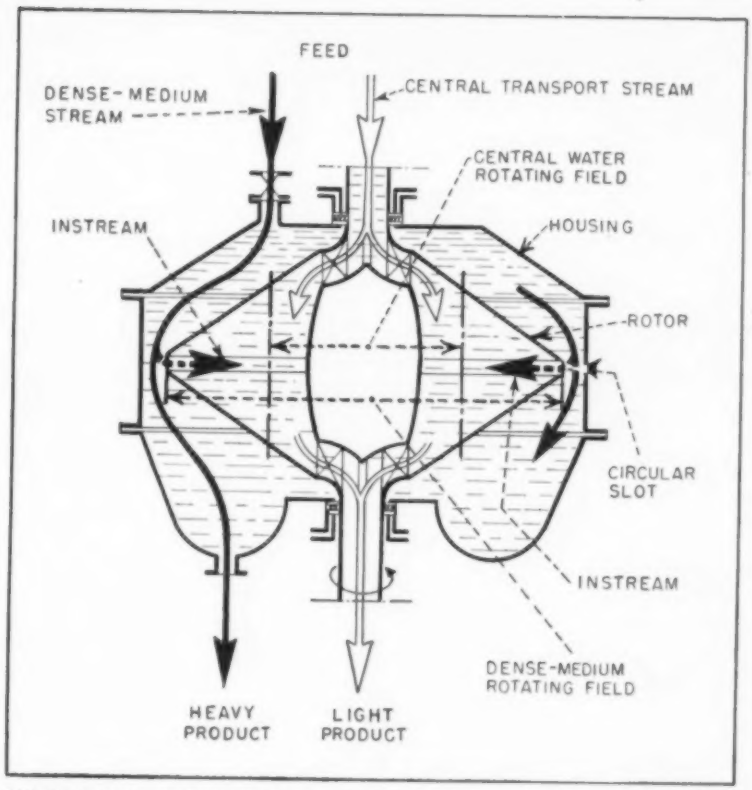
In many instances, ready-made teaching facilities are available in your own organization. A skilled electrician can do a very effective job of teaching by demonstrating with an actual motor in a planned class session the symptoms of worn bearings. Maintenance demonstrations could also be performed with heavy equipment, such as, shuttle cars, loaders and locomotives, that are in the outside shop for planned overhauls.

When setting up a training program take advantage of all the help available. This includes know-how in your own company, vendor's knowledge of his equipment, and any assistance you can obtain from vocational schools, and state and federal consultants.

REPORTS TO MANAGEMENT

Management backing is essential. However, management will continue to support maintenance only when it can gage performance. It is essential, therefore, that regular maintenance reports be turned in (along with production reports) so that the effectiveness of the maintenance program can be appraised. The form of each report will be determined by each operator. However, they should include:

1. An analysis and record of breakdowns over definite periods.
2. An estimate of the amount of money lost due to breakdowns, including all factors, such as, labor, overtime, repair work and lost production.
3. A concise and complete report on how to improve maintenance operation by comparing the difference between cost of existing production losses and the cost and benefits of proposed improvements. This is productive maintenance at its best.



CENTRIFUGAL SEPARATOR features dense-medium rotating field. Tests show good qualitative and quantitative results.

Dense-Medium Centrifuge Cleans Fine Coal

A NEW METHOD of cleaning fine coal has yielded promising pilot-plant results at Harper Mining, Inc., Dortmund, Germany, according to *Iron & Coal Trades Review*. The new method employs a dense-medium centrifugal separator that uses a dense-medium rotating field. The unit has a mechanically produced constant rotating speed.

In contrast to a cyclone, the dense-medium rotating field can be kept free of streams or may be permeated by streams of any force. Thus it is said to be adaptable to a variety of changes in the characteristics of the feed and the dense medium.

The dense-medium rotating field permits feed to be introduced in a central water stream and clean coal to be recovered in the same stream. The quantity of dense medium in circulation is almost entirely determined by the quantity of heavy material in the feed and is only a fraction of the quantity required by a cyclone or cyclone-separator operation.

Washing tests made with units of various sizes, using a centrifugal force about 30 times the acceleration of gravity, gave good qualitative and quantitative results.

HOW THE SEPARATOR WORKS

The hollow rotor, which turns inside the housing, consists of two movable cone-like parts. These are assembled so that at the outer edges they form a circular slot. The shaft of the rotor is hollow. If the housing and the hollow space between the cones of the rotor are filled with a dense medium, the dense medium locked in the rotor spins when the rotor revolves because of the friction of the movable cones on the dense medium. Thus the enclosed dense medium forms a rotating field that revolves at a constant speed and makes contact with the dense medium outside the cones only through the circular slot.

HOW COAL IS CLEANED

Separation of coal and refuse takes place in the dense-medium rotating field. Feed is introduced either by a central transporting current which enters through the hollow shaft of the rotor, or by a dense-medium enveloping current which enters the space between the rotor and the housing. When the feed is delivered to the rotating field by the central current, heavy particles are forced by centrifugal force into the enveloping stream. On the other hand, if the feed is introduced with the enveloping stream, the clean coal is drawn radially through the rotating field into the central transporting stream. In either case, the clean coal is removed by the central stream and the refuse by the enveloping stream.

The speed of the dense-medium rotating field in the rotor is independent of the transporting currents. The field can be spun at any desired speed, and thus can be subjected to any desired volume or velocity of the two currents. By raising or lowering the static pressure in the housing, the rotating field can be kept completely free of radial currents or a current of desired force can be made to flow toward or away from the rotor.

While the stream introduced between the housing and rotor must always consist of a dense medium, the central stream can have a lighter specific gravity. It can even be water. Because of its lower specific gravity a central water stream cannot break through the heavy-medium rotating field. This has a decided advantage because no dense medium is needed to introduce the feed or remove the clean coal. If a true solution is used as a dense medium, the dense-medium rotating field can be easily maintained.

A dense-medium suspension requires special measures because the suspended particles are subjected to a centrifugal force in the rotating field. Thus they are ejected from the rotating field. However, the proper concentration of medium can be maintained. Dense medium can be added either through the central stream entering the rotor or through the inward stream entering through the slot between the rotor cones. However, the central stream must carry a dense medium if more is to be added through it. But if medium is added through the slot, the central medium can be water.

KEY MACHINE at Piper augering job is this 48-in self-moving machine that works in narrow pit. Three swivel-mounted hydraulic moving jacks under the chassis place the augering machine into position at new hole.

PREPARING BENCH for augering, 1½-cu yd diesel shovel makes a narrow cut along the coal outcrop.

END-ON VIEW of Piper augering operation shows 48-in auger in drilling position. Bench is wider than normal.

CLEANUP WORK ahead of auger is done by bulldozer. Unit works next to auger while operating crew has lunch.

ELEVATING CONVEYOR driven by gasoline engine transfers coal from auger to truck. Unit is moved by truck.

SELF POSITIONING is feature of the 48-in auger. Moving is done by three swivel-mounted jacks, two at the rear (arrows) and one at the front.

MOVING POSITION shows auger resting on hydraulic movers (arrows) and bases of big leveling jacks at corners of unit above the ground.

Highwall Augering In Tight Quarters

HIGHWALL AUGERING to recover high quality coal between the outcrop and worked out mines is one of the specialties of The Piper Corp., Charleston, W. Va. The corporation's latest venture into this field is the recovery of coal in an area that could not be stripped because of steep hills that would permit spoil to roll or slide downhill and damage vital mine installations, such as, fans, substations and access roads. Using two augers full time and a third as a spare, Piper produces 700 tpd in one shift.

For many years The Piper Corp. was primarily a strip-mining organization, concentrating in the mountain areas of West Virginia. About 6 yr ago the corporation moved equipment to Abbott's Fork of Cabin Creek to recover the portion of the Dorothy seam near the outcrop that Carbon Fuel Co. was unable to recover by underground methods.

For the first 2 yr, Piper concentrated on stripping alone and usually worked to 45-ft banks. To supplement the stripping equipment and add flexibility to the operation, the company bought a Cardox highwall auger in 1952. This was a Model 145 unit equipped with a 42-in cutting head and 36-in augers. Later a Cardox 155 auger, equipped with a 45-in cutting head and 40-in augers, was added.

When stripping work approached mine facilities, such as roads, fans and substations, coal recovery had to be limited to augering. Most of the facilities were below the outcrop and the steep hillsides did not permit spoil to be cast over the hill because of the danger of damaging the installations with boulders or slides.

To increase mine capacity and add more flexibility, Piper bought a Cardox 235 unit. Equipped with 48-in augers and a 50-in cutting head, the 235 machine is the first one in service and has been producing coal for nearly a year. A self-moving unit equipped with 12-ft auger sections, the machine is designed to work in pits only 26 ft wide. A 235-hp Hercules diesel engine drives the auger and an 80-hp Hercules diesel powers the hydraulic system. The hydraulic system operates all auxiliary equipment, such as, the hoist that lifts auger sections into position; the winch that pulls auger sections from completed holes; and jacks for leveling and moving the machine.

Self positioning is a major design feature of the machine that permits speedy moving to a new hole or leveling. No rails, skids or separate power unit are needed for moving the machine. The work is done by three hydraulic positioning jacks which move the machine into position against the coal or to a new hole.

One jack is mounted at the front, or augering, end of the machine; two others are located at the rear. All three jacks are mounted on swivels so that the machine can be moved in any direction.

As soon as the hole is completed, the three jacks are rotated into position to move the auger against the coal at the new hole. Jacks are free moving and are swung into position manually. Positioning of the moving jacks is done while the machine is in the drilling position and resting on the four leveling jacks.

Leveling and vertical positioning of the auger once it is at a new hole is done by four independently controlled hydraulic jacks. These units have a 6-ft vertical range that permits holes to be drilled one over the other for greater coal recovery. In an average pit, it takes about 3 min to move and reset for drilling a new hole.

BENCH PREPARATION

The augering bench on one side of the valley is prepared by a 1½-cu yd Lorain diesel shovel and Caterpillar D8 bulldozer. The shovel exposes the coal and cuts a narrow roadway. Final leveling of the spoil into a working area is assigned to the bulldozer. Width of bench is kept to a minimum to prevent material from rolling down the mountain side. Only a narrow bench is needed since the largest auger needs only 28 ft to operate. However, if two augers operate in the same pit and trucks must pass one

WINCH is used to pull auger sections from hole. Operator releases rope drum by moving overhead rod.

ADDING an auger section is done quickly and easily. One man operates overhead hoist and connects sections.

OVERHEAD HOIST travels on steel channel while transferring auger sections from storage area or completed hole to drilling position.

unit, the bench must be made wide enough to permit them to pass. The shovel works on the day shift, 5 days per week while making the initial cut.

The bench on the opposite side of the valley is prepared by a Caterpillar D8 bulldozer. A partial bench is provided by an old tramroad, so the bulldozer merely widens it while exposing the coal seam. In addition to making the benches, the bulldozers help to maintain roads and keep the area immediately ahead of the auger clean.

HOW AUGERING IS DONE

Piper produces an average of 700 tpd with the three augers. However, the three machines do not operate at capacity because trucks must make the 11-mile round trip to the unloading station. The smaller 145 unit frequently serves only as a spare. If all three worked at capacity or standards set by the company, output could be 1,004 tons per shift. This standard output is divided as follows: 234 tons for the 145 machine, 338 tons for the 155 unit and 432 for the 235 auger. These values are based on 600 ft of augering per shift for the 145, 750 ft for the 155 and 720 ft for the 235 machine.

Three gasoline-driven elevating conveyors transfer the coal from the augers to trucks. There are two Wall units and one Godfrey machine. Each of the elevators is positioned in front of the hole by one of the trucks.

The company attempts to recover as much of the available coal as possible by augering into the mined-out areas. Sometimes the augers penetrate to a depth of 160 ft, but for the past 8 mo the old mine workings have been intersected at an average depth of 60 ft.

Pillars 6 to 12 in thick usually are left between holes. The site for each auger is selected so that as much of the seam height as possible can be removed from one hole. However, when the seam thickens and one auger cannot recover most of the coal, two intersecting holes are drilled.

At times, bottom rock is taken so that the elevating conveyor can be placed below the seam and the big 235 auger can remove practically the full height. One man drills rock, loads explosives and blasts the rock. The broken material then is pushed over the hill by the bulldozer.

CREWS

All work at the Piper augering job is done by 36 men. Each of the three augers is manned by three men. One man operates the elevating conveyor feeding the trucks, another runs the auger drive and the third handles the auger sections with the aid of the hydraulic hoist. Other personnel include: two men on the 1½-yd shovel; 1 bottom-rock driller; 2 bulldozer operators; 2 mechanics; 1 supply man; 14 truck drivers; 3 belt men, who maintain the belt conveyor through the mountain and keep the dumping station clean; and 2 foremen.

TRANSPORTATION

A fleet of 14 trucks haul coal on roads built on the augering bench and discharge it into a transfer hopper at a mine portal. From there, it travels 1,200 ft on a 30-in belt conveyor through the mountain to a 250-ton silo. It next is fed to a 2,000-ft decline belt conveyor that terminates at the Carbon Fuel Co.'s preparation plant at Notamine, W. Va.

MANAGEMENT

W. L. Piper is president of The Piper Corp.; John Piper is vice president; and Lyle Piper is secretary. T. F. Lilly and Otis Craghead are foremen at the augering operation.

RECLAMATION

After a section of outcrop has been augered and it no longer is necessary to maintain a road in the area, the company backfills the mined territory. Material that has been removed to provide a working bench is piled against the highwall to a depth well above the coal. Assorted tree seedlings then are planted in the backfilled area.

Better Underground Lighting

Early experience with improved mine lighting, using fluorescent lamps, indicates that increases in safety and productivity may be immediate benefits.

By S. P. CARTER
Superintendent of Maintenance
Armco Steel Corp., Montcoal, W. Va.

THE LEVEL OF ILLUMINATION in coal mines has always lagged far behind that of other industries. The underground coal miner has always had to perform his work with much less light than that used in similar work in other industries. We in the coal industry have come to accept this as a matter of fact without very much thought as to the reasons why this condition exists.

We believe there is a direct relationship between the level of illumination and the accident-frequency rate of any industry. In every industry where there has been a substantial improvement in illumination there has also been a corresponding decrease in the accident-frequency rate of that industry. In a comparison with other industries, coal mining has the lowest level of illumination and one of the highest accident-frequency rates.

The miner's electric cap lamp first appeared in coal mines in the year 1915. However, it was not universally accepted in the mines of this country until the early 1930's. There have been many improvements in the electric cap lamp during the past 40 yr and today it is an excellent piece of industrial equipment.

The electric cap lamp furnishes a cone of light of relatively high intensity. However, outside this cone the intensity is practically nil. We must remember that the electric cap lamp was designed to furnish illumination for the individual miner when he was working by himself in a single place.

MINING PACE INCREASED

Let us now take a look at our miner of 1956. He is no longer confined to a single working place, but he is moving continuously in a cycle from one place to another. He may be working in as many as twelve different places within a single shift. As his means of production, he has large, highly mobile, fast moving machines, powered by electric motors ranging in the hundreds of horsepower. Due to the noise of the machinery, he can no longer make use of his sense of hearing as a means of detecting changes in roof conditions. There may be as many as five or more men concentrated in one place, in a confined space, each man performing a separate operation, yet all working in close proximity to powerful fast moving machinery under rapidly changing physical conditions. Each miner must not only see what he is doing, but must also be able to see other workmen and the changes that are taking place around him.

Development of mining machinery and changes in mining methods have progressed at a very rapid rate during the past ten years. Changes in methods create problems. If we look closely at our mine lighting, I believe we can say that it has not kept pace with our changes in methods. The electric cap lamp is no longer adequate for our methods of operation.

This problem would be very simple, if we could requisition a mine lighting system from our supply store, or order one from our electrical distributor or our mining machinery manufacturer. The facts are that no such lighting system is available.

PROBLEMS IN DESIGN

The design of an approved mine lighting system that will be effective and practical for use underground is one of the most difficult tasks ever given to a design engineer. The restrictions placed on a lighting system for face illumination of a coal mine are tremendous. We need a safe, practical system, yet the requirements are so severe that the design of such a lighting system is an almost impossible task. Good practical mine lighting is not compatible with mine conditions, methods, and restrictions. This is our problem.

The directors of Bituminous Coal Research, Inc., recognizing the need for better illumination in the active working area of coal mines, authorized a mine illumination project by the development committee of this organization in 1953. This project had the objective of determining the feasibility and practicability of lighting the active working area of a coal mine. This was the beginning of what has become known as "area lighting in coal mines."

The development, experimentation, and the first installation of an area lighting system under this project was at the Owings mine, Consolidation Coal Co., Owings, W. Va. Here it was proved that the active working area of a coal mine could be successfully illuminated. The second phase of this project was to evaluate the lighting system developed at the Owings mine to determine the advantages, disadvantages, and the problems encountered in the operation of this type of lighting system.

ARMCO LIGHTING METHODS

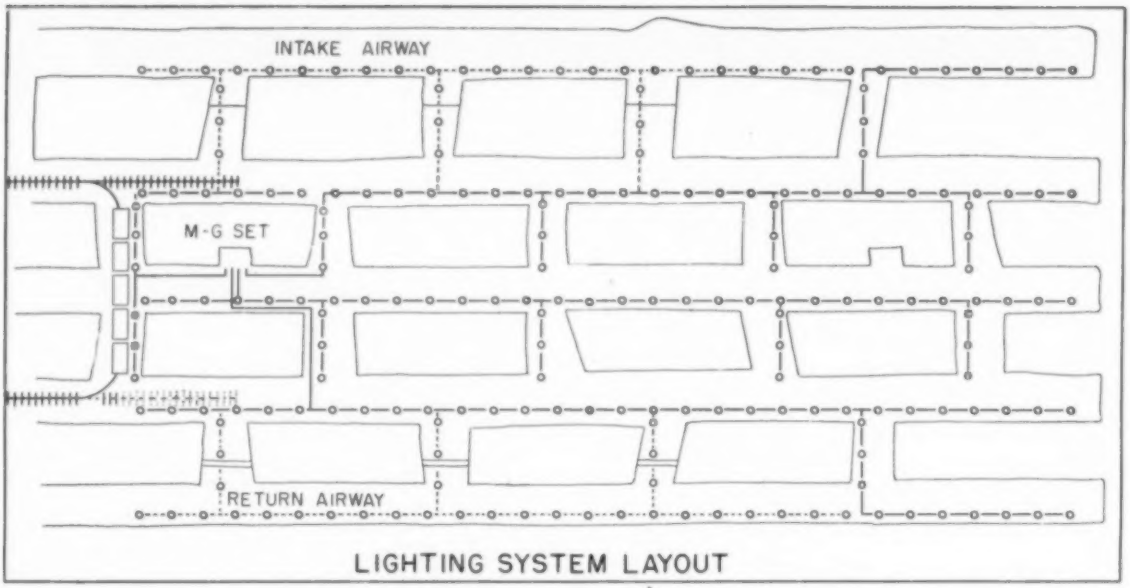
The lighting equipment was moved from the Owings mine to the Dorothy mine of Armco Steel Corp., Montcoal, W. Va., in May, 1954. The system has been in continuous operation in the same section of the Dorothy mine since May, 1954, a period of approximately 24 mo. There has been no attempt made to alter or improve the equipment since it has been at the Dorothy mine.

Fig. 1 shows the mining plan used in the Dorothy mine which is the conventional room and pillar system of mining. Entries are driven 18 ft wide on 50-ft centers in sets of four and five entries abreast. Crosscuts are driven on 100-ft centers and are also 18 ft in width. The pillar blocks are 32 ft wide by 82 ft long. Rooms are driven on the same centers and in the same manner as the entries. There are six production sections operating at Dorothy.

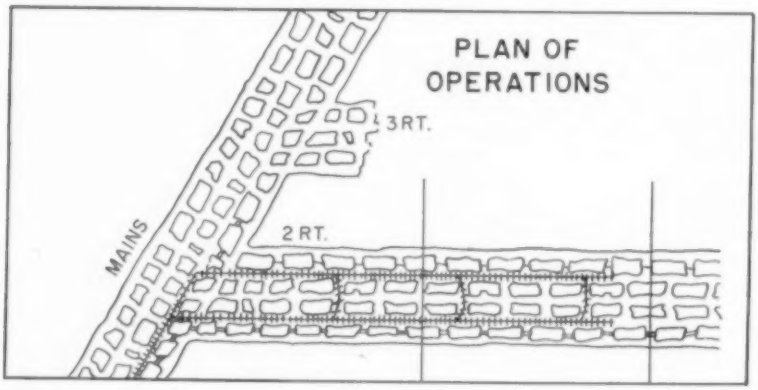
The Dorothy seam has an average height of approximately 6 ft. There is a hard-slate parting near the middle of the seam which will vary in thickness from a few inches in some localities to as much as 3 ft in other places. The thickness of the coal seam, above and below the parting, is fairly constant and the roof height varies according to the thickness of the parting. Full-seam mining is the rule.

The mining machinery in the lighted section is conventional off-track equipment. The equipment consists of one rubber-tired universal cutting machine; one crawler-mounted loading machine; a hand-held hydraulic coal drill; one rubber-tired rotary roof-bolting drill, two rubber-tired shuttle cars and one car-spotting hoist.

Adapted from a paper presented at recent meetings of W. Va. Society of Professional Engineers and Mine Inspectors' Institute of America.



LIGHTING SYSTEM LAYOUT



The shuttle cars dump directly into mine cars.

COMPONENTS OF SYSTEM

The mine lighting system has only three separate components, the light fixture, the power cable and the power-conversion unit. The lighting fixture is a modified household fluorescent fixture. The unit weighs 6 lb and is approximately 13 in in diameter. The fluorescent tube is a 12-in, 32-w, 115-v, 60-cycle, Circline lamp. In the back cover of the fixture is mounted one incoming power receptacle and two outgoing power outlets.

The trigger-start ballast unit for operation of the tube is mounted inside the back cover and weighs approximately 2 lb. This unit requires approximately 1 amp of current and operates at about 50% power factor.

The power cable is composed of three conductors of No. 10 wire with a suitable jacket. Each section of cable is 16 ft long with a three-conductor male plug on one end and a mating female plug on the other end.

One length of cable is required for each lamp installation. The male plug attaches directly to the power supply outlet, the female plug goes to the incoming power receptable in the back of the light fixture.

POWER FOR LIGHTING

The power unit consists of a 25-hp, 1800-rpm, 250-v, DC motor, coupled directly to a 3-phase, 120/240-v, 60-cycle, 18.75-kva AC generator. The controls for the driving motor, the generator and the power-distribution panel for the lighting system are all mounted on a frame which is attached to the base plate of the m-g set. This unit is capable of furnishing power for 270 lamps.

The power-distribution panel consists of eight outlets for the various lighting circuits. Each outlet circuit is protected by a 30-amp thermal magnetic circuit breaker. The power unit is skid mounted and may be pulled on the mine floor by a shuttle car to the new location, or it can be loaded into the shuttle car and hauled to the new location.

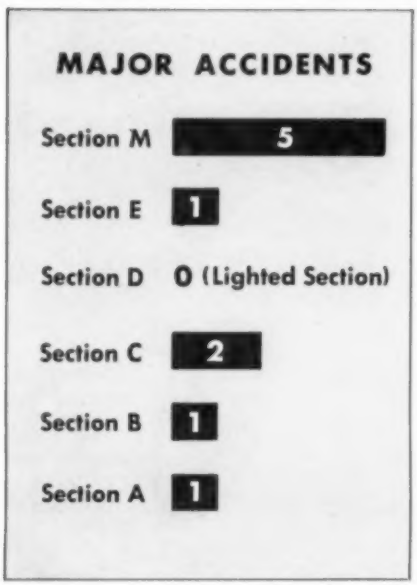
The layout of the lighting system in a fully extended section is shown in Fig. 2. The m-g set is located in the offset in the left-hand rib of the center entry about 50 ft inby the mine car loading station.

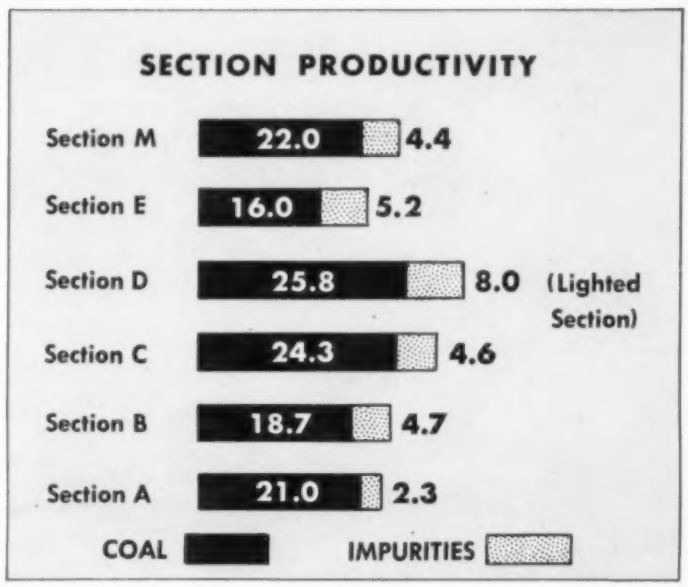
SYSTEM LAYOUT

Four main-lighting circuits are taken from the power distribution box to light the section. There is one circuit for each of the three inside entries. The fourth circuit lights the mine car loading point and the supply yard. Each of the outside entries are lighted from the same circuit as its adjacent inside entry. The two outside entires have lights only from the last open crosscut to the face. There is no work or travel in the two outside entries outby the last open crosscut. Therefore, no lights are needed in these particular areas.

Each of the three inside entries requires 30 lights when advanced a maximum distance of 450 ft from the mine-car loading station. Seven lights are required for each of the outside entries. Three lights are installed in each open crosscut.

The lights in the entries are suspended from the roof or timbers and are about 3 ft from the right-hand rib. Approximately 2 min is the time required for installation of a fixture and cord. The lights in the crosscuts





are suspended along the outby rib of the crosscuts.

The maximum number of lights in use at one time is 140. The maximum floor area illuminated in the setup is 37,784 sq ft. There is an average of 252 sq ft of floor area to be illuminated per lamp. The minimum number of lights in use is 62 and this will occur when the motor-generator set is moved forward for a new setup. The motor generator and the mine car loading station are advanced in steps of 300 ft. The 15-ft spacing of the fixtures gives an average light distribution of from 1 to 2 foot-candles along the left-hand rib and in the active working area of the faces. It is believed that this is a minimum acceptable value for area mine lighting, and that additional light is needed in the active working faces.

SAFETY, PRODUCTION BENEFITS

Fig. 3 shows the major accident record of the production sections of the Dorothy mine from May, 1954, when the lights were installed to the present time, a period of approximately 24 mo. Three sections have each had one accident, one section has had two accidents, and one section has had five accidents. Section "D," the lighted section, has not had an accident during this period.

A comparison of the production performance of the six sections of this mine for the year 1955 is shown in Fig. 4. The length of the solid bar shows the tons per man shift of clean coal. The dashed section on the end of each bar is the tons of impurities per man shift, due to middle band in the seam. The lighted section produced more tons of clean coal per man shift in 1955 than any of the other sections and this section also handled the largest tonnage of impurities. The total tonnage handled per man shift by the lighted section was 17% above that of the next higher production section.

The area lighting system has been found a definite aid to the foreman in that it gives him a wider over-all vision of the different operations that are going on in each face of the section. The lights are particularly helpful to the loader operator and the shuttle car operator. Better housekeeping is another definite advantage.

Supplies are more easily kept in order and fewer supplies are lost because anything on the mine floor is immediately visible to everyone. There is less fatigue of the workmen because of a decrease in the useless motions that he formerly went through due to not being able to see his entire surroundings. The morale of the entire working face on this section is increased, due to improved working conditions.

ESTIMATED COSTS

The cost of the equipment used in this experimental installation is not known, due to the fact that part of the equipment used was furnished by manufacturers as no cost to the project. It is estimated that the equipment would cost from $8,000 to $10,000. The probable cost of an approved mine lighting system for a section would be only a guess since there is no approved system on the market.

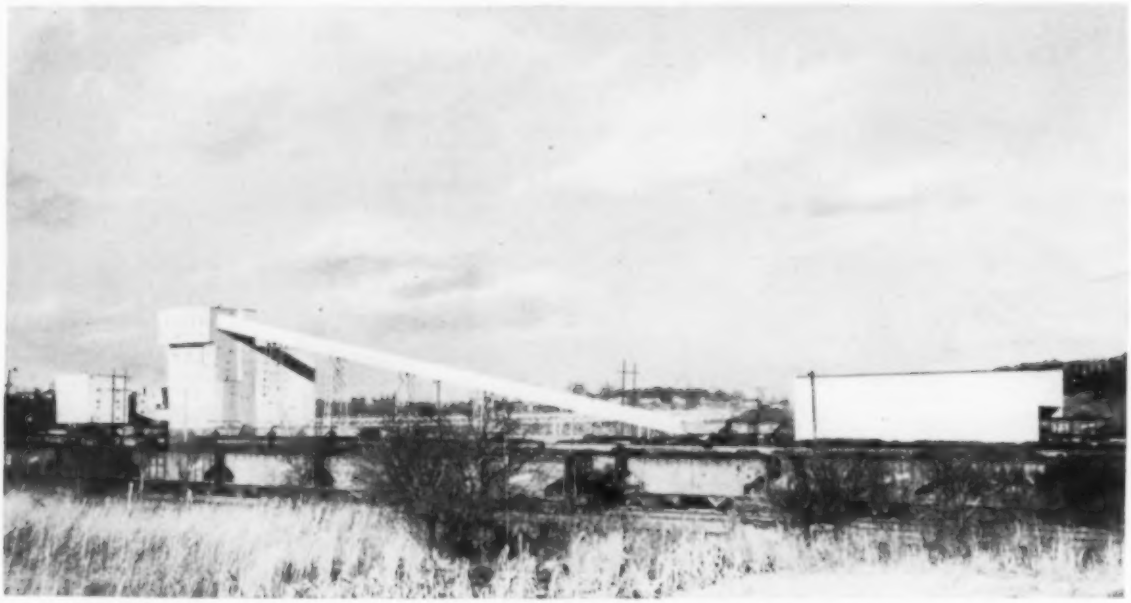
It is estimated that the power cost for operation of a section lighting system of the size of the experimental installation would be approximately $40 per mo for two-shift operation.

This mine lighting system is an experimental installation and, as such, is not permissible for use in coal mines. The experimental installation of this equipment in an active mining operation was made possible through the cooperation of the personnel of both the W. Va. Department of Mines and the U. S. Bureau of Mines.

We in Armco are very happy to have been given the opportunity to take part in this experiment. We believe the lighting of the active working area of coal mines has many advantages and that these advantages may well exceed expectations.

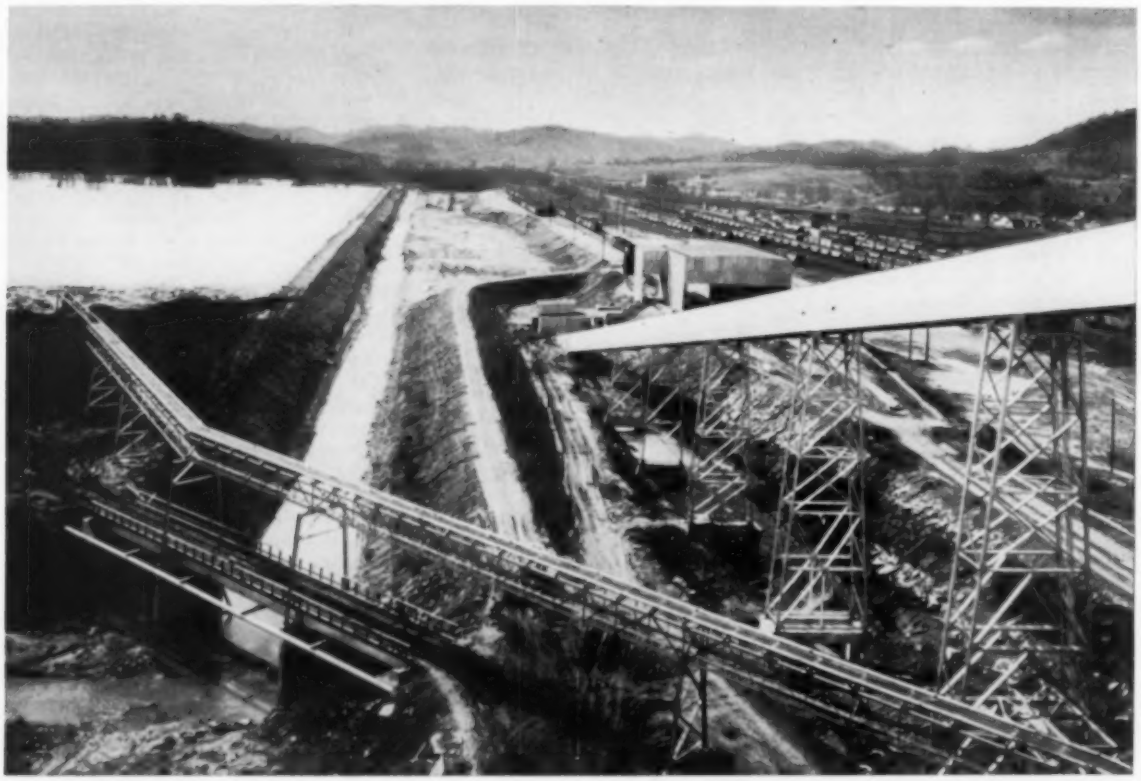
U. S. Bureau of Mines Schedule 29 covering the inspection and approval of "Mine Lighting Equipment for Illuminating Underground Workings" was published in the Federal Register, Tuesday, Jan. 10, 1956. There are a number of manufacturers working on the development of mine lighting systems and we believe that an approved mine lighting system will be available to the coal industry within a short time.

Adequate mine lighting will not solve all of our safety problems because we have many accidents in which lighting is not a factor. Nor will it solve all our production problems. We believe it to be a desirable working tool, a help in the prevention of accidents, an aid to increased production and an improvement in working conditions.



SPECIAL-PURPOSE STEEL built into coal and refuse circuits of new Corbin plant promises longer life with consequent reduction in costs for replacement materials and labor. The aim is to match modern materials with latest plant designs.

Corbin Plant: Modern materials for today's coal cleaning



ABRASION-RESISTANT alloy steels are used in blending units at bottom of plant-feed conveyor and in 8-in refuse pipeline (foreground). Coal from four seams at Lynch mines is blended to provide uniform plant feed.

Special Steels Cut Maintenance Costs at Corbin Cleaning Plant

LONGER LIFE in abrasive and corrosive applications and reduced operating and maintenance costs are the main reasons for specifying special steels, including stainless, in the design of the Corbin, Ky., cleaning plant of the United States Steel Corp. Based on the premise that modern plants should employ the latest in economy-producing materials, even though initial cost may be somewhat higher, the Corbin plant features stainless-steel liners in flumes, chutes, screen surfaces and the stacks of heat driers. Some parts of the plant structure and the outer shells of chutes and flumes are made of high-strength, low-alloy steel.

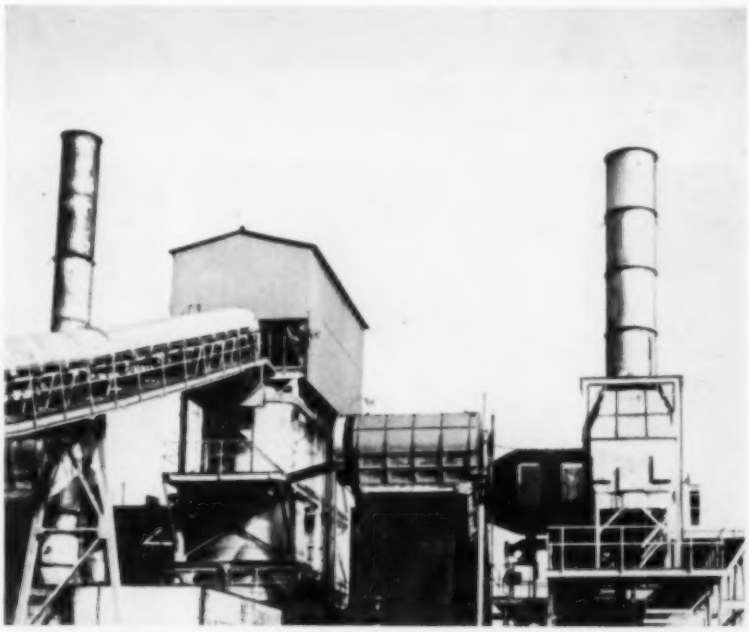
Austenitic non-magnetic steel is used in the housing and support structure of the tramp-iron magnet to eliminate the possibility of having the magnet misplaced through its attraction to the structure. Through applications like these, the plant designers have achieved improved flow of coal and reduced labor costs in maintaining the coal and refuse circuits. More than 160 tons of these materials have been built into the Corbin structure and circuits.

The plant is situated about 90 mi west of the corporation's mines at Lynch, Ky., where terrain and other factors made it impossible to construct such a facility. The 470-acre Corbin site, offering among other advantages disposal room for washery refuse for about 30 yr, is on the main rail line from Lynch to the U. S. Steel's lake-front coke plants, making it possible to clean the coal in transit without any backhauling.

The two mines at Lynch produce about 17,000 tpd, raw coal, from the B, C, and High Splint seams. The clean coal provides the high-volatile portion in coke blends carbonized at lake-front centers such as Joliet, Gary, Lorain, Cleveland and Duluth. The raw coal averages 9.5% ash, although variations from this average range from 5 to 30%. Since low ash content and uniformity are of prime importance in promoting best blast-furnace performance, the plant must produce coal reasonably close to the guaranteed average analysis of 3.5% ash. With respect to uniformity, which requires that 67% of samples in any month shall be within plus or minus 5% of the guaranteed analysis, the Corbin plant has measured up to expectations, and an average yield in clean coal of approximately 90% is consistently maintained.

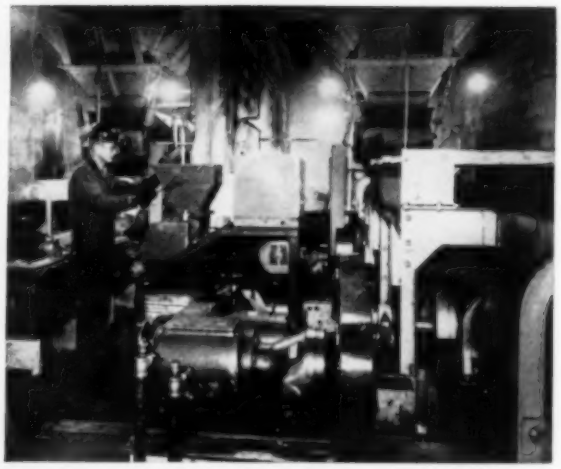
The plant was designed by Allen & Garcia Co. to handle feed of 600 tph. However, after a few months' operation the throughput in raw coal averages closer to 800 tph. Output for the record day so far is 17,500 tons of clean coal in 24-hr operation. This increase in capacity is attributed in part to the design of the wet table plant and its auxiliaries, including bowl desiltors to remove up to 90% of the minus 200-mesh slimes from the table feed and solid-bowl centrifuges receiving the deslimed table product and discharging a cake of 6.5% surface moisture. This permits an increase in the feed to the heat driers, which were the source of the original 600-tph figure. Furthermore, the shipped product averages 4% total moisture, while the guaranteed average permits 4.5%.

Another feature in fine-coal handling is the use of a radial slurry screen taking the underflow of the clean coal desanding screen to recover the plus 28-mesh coal in this stream. Sand and water passing through the screen are returned to the Chance-cone sand sump, and the plus 28-mesh coal is returned to the raw-coal sizing screens where it is diverted into the tabling circuit. The radial screen at

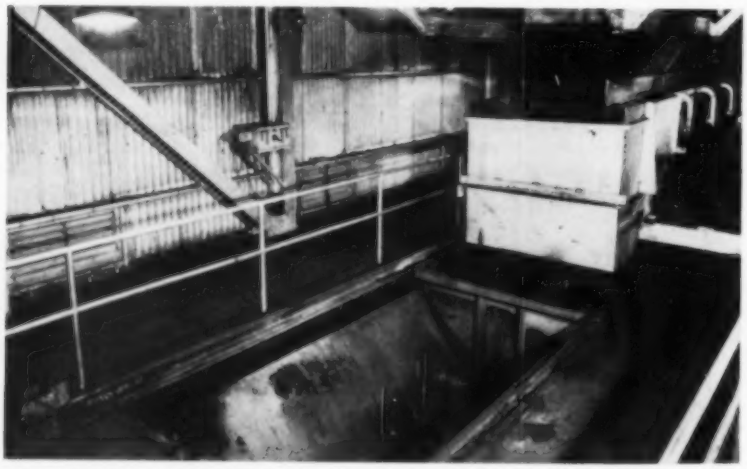


DRYING PLANT features experimental installation of stainless-steel stack. Carbon-steel stack on another drying unit is to be replaced with stainless.

RAW COAL (8x0) from various seams is unloaded into separate 600-ton bins. Four such bins now are in use.

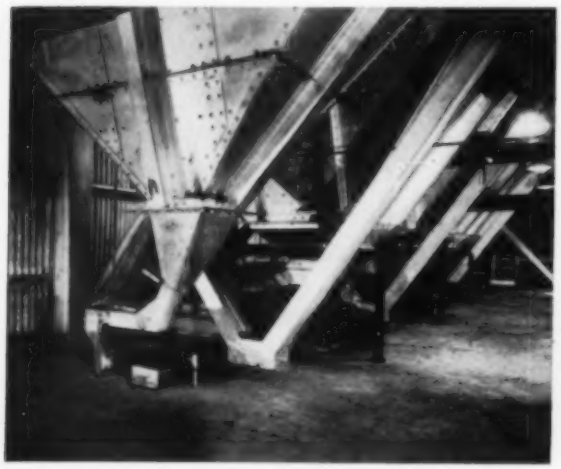


DIFFERENT COALS are moved on four weighing belts past raw-coal sampling to 60-in R-O-M belt conveyors.

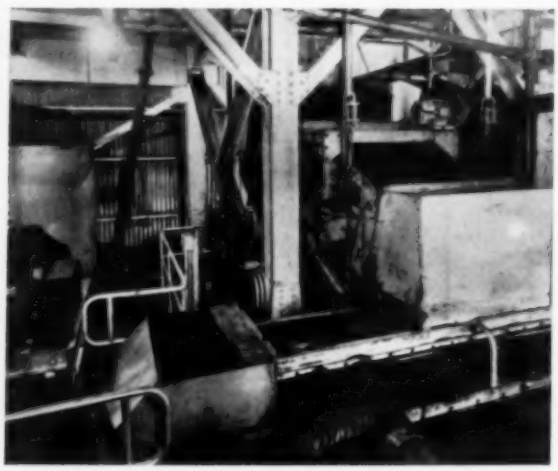


FOUR 50-TON SURGE BINS at top of plant are fed by 60-in shuttle conveyor. Raw coal at this point has been crushed to minus 4 in in transit.

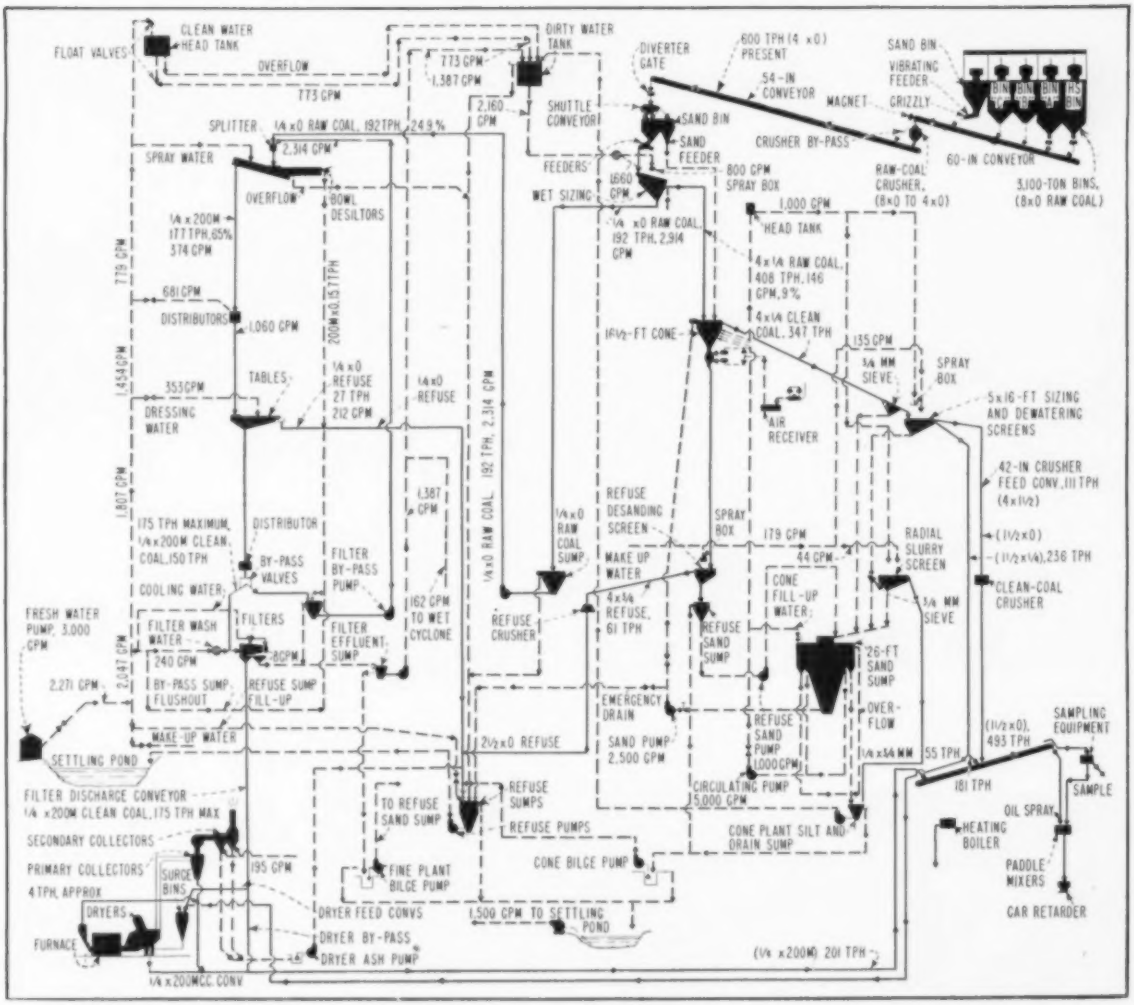
Abrasion-resistant liners bolted into high-strength frames lead to lower overall costs in raw-coal handling. Stainless steel in wet circuits cuts corrosion damage.



SAND BIN (foreground) provides in-plant storage of medium for coarse-coal cleaner. Four others contain raw coal.



SCREEN HOPPER and conveyor-feed chute at raw-coal screen are made of high-strength steel lined with stainless.



ORIGINALLY designed for 600-tph, Corbin now processes 800 tph. Raw-coal facilities permit growth to 1,200 tph.

Corbin is the first U. S. installation of the German development.

In most instances, chutes and flumes are built of a high-strength, low-alloy steel (USS Cor-Ten) to provide the necessary load-bearing strength with minimum weight. All joints in these units are welded. Liners of abrasion-resistant steel (USS A-R) are bolted inside the Cor-Ten bodies as replaceable wear plates. Impact wrenches are available in the plant to speed this replacement work. Where slideability, corrosion resistance and long life are paramount factors, stainless-steel liners or solid stainless steel are used.

Typical applications include the following: 5/16-in Cor-Ten lined with 3/8-in A-R:

- Hoppers and chutes from blending bins
- Chute from scale belt conveyor to R-O-M conveyor
- Chute from R-O-M conveyor to plant feed conveyor
- Discharge and diversion chutes from R-O-M conveyor

3/16-in Cor-Ten lined with 1/4-in A-R:

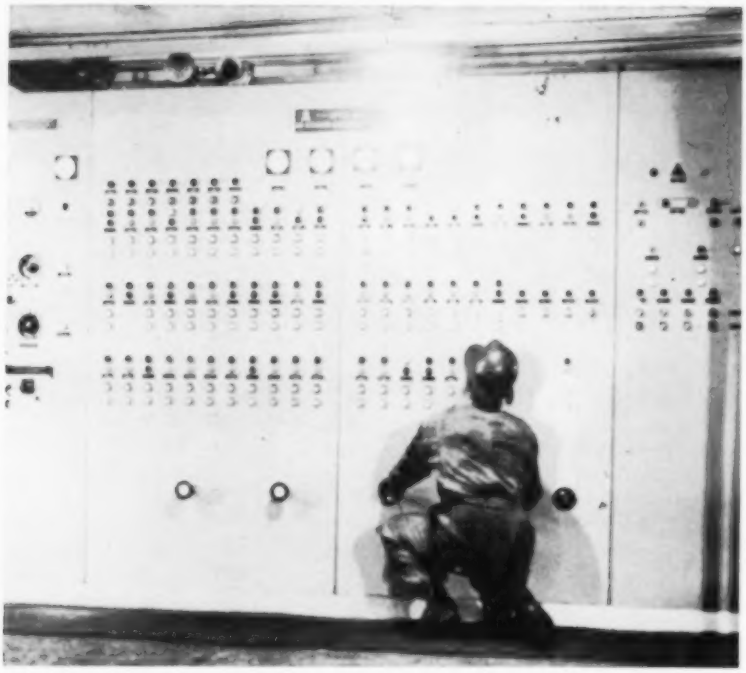
- Discharge chute from desanding screen to clean-coal belt conveyor
- Discharge chute from dewatering screen to clean-coal belt conveyor veyor
- Chutes from Bird filters to conveyor

Other applications include solid 3/8-in Cor-Ten in two refuse sumps, the Chance-cone sump, the Bird effluent sump and the water-supply head tanks. Stainless steel (Type 410) lines the chute from the sand bin to the vibrating feeder and the splashplate, hopper and sluices receiving the discharge of the clean-coal screens. Solid 410 is used in the clean-coal and refuse sluices from the cone and the tables and in similar wet applications.

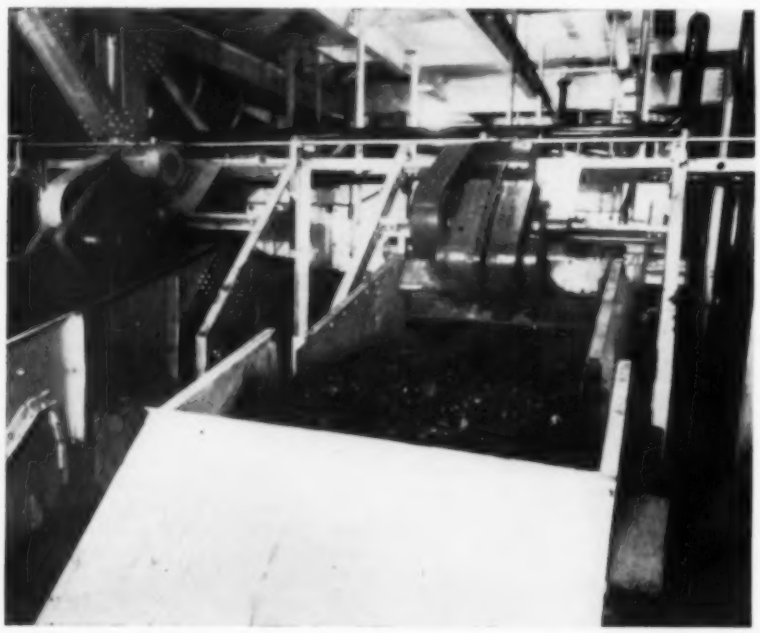
It is expected that the higher initial cost of these materials will be quickly recovered in longer life, conservatively estimated as three times that of conventional carbon steels, and from reduced maintenance-labor costs. These savings extend also to the stainless-steel wedge-wire, woven-wire and perforated screen surfaces used throughout the plant.

The preparation process begins at Lynch where the raw coal is crushed to minus 8 in. The railroad cars are loaded at Lynch with coal from only one seam and each car is marked to show the seam of origin. The cars are separated at the cleaning plant according to seam of origin and placed on separate tracks to be unloaded into four 600-ton bins.

(*Continued*)



COARSE-COAL CIRCUIT, including 16½-ft sand cone, is controlled from this centralized panel (above). Underflow of stainless-jacketed desanding and dewatering screen is fed onto radial slurry screen, a new unit in U. S.



Raw coal from the three seams is blended into a uniform feed for the plant as it leaves the storage bins over dual vibrating feeders at the bottom of each bin. Each set of feeders discharges to an individual 42-in weight-recording belt conveyor and these four conveyors discharge onto a 54-in conveyor. Raw-coal samplers are installed at the discharge points of the weighing belts.

Tramp iron is removed over the 54-in belt, ahead of a 30x72-in single-roll crusher which reduces the blended raw coal to minus 4 in. At the top of the plant the 4x0 raw coal is distributed to four 50-ton surge bins by a 60-in shuttle belt.

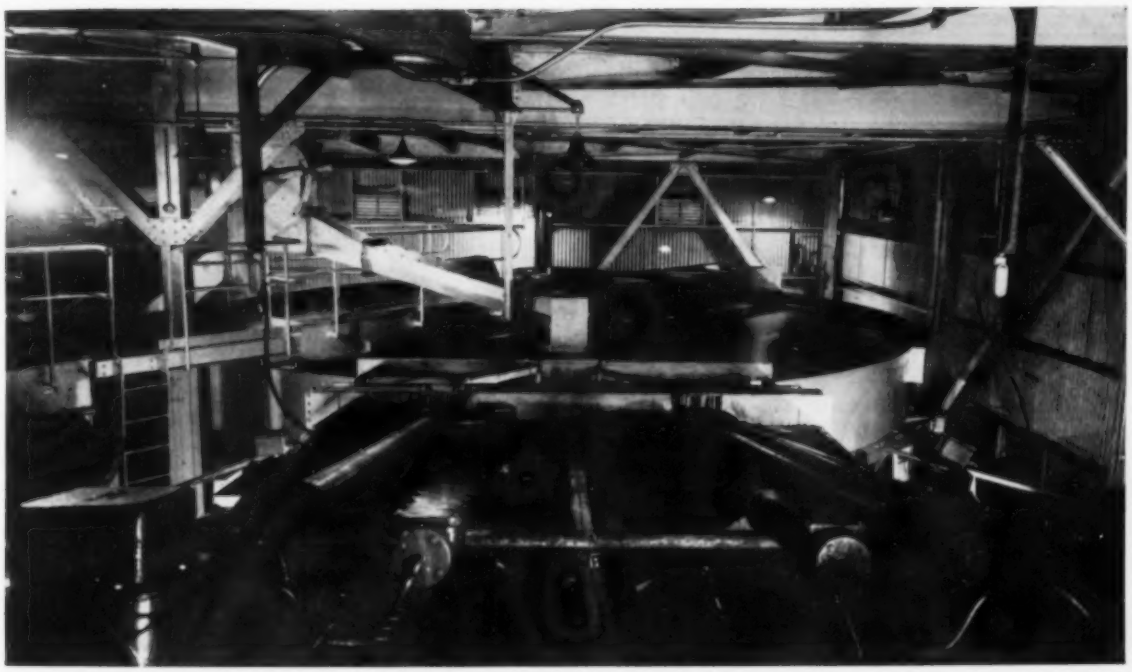
Sand for the 16½-ft Chance cone is stored in a track bin, similar to the storage bins for run-of-mine. The 54-in plant feed belt is run free of coal at intervals to permit sand to be brought into the plant on the same conveyor. The in-plant surge bins for 4x0 raw coal provide a constant feed rate to the raw coal screens, even though the plant-feed conveyor may be transporting sand.

Vibrating feeders under the surge bins discharge into launders where 2,400 gpm of clarified water is added to move the coal to the 5x14-ft primary screens. The feed is split on the primary screens into 360 tph of 4x¼ and 240 tph of ¼x0 to serve the Chance-cone and table circuits, respectively.

Outstanding features of the coal cleaning circuits are continuous desilting in the cone circuit on a radial screen and desilting of the table feed in bowl desiltors, as mentioned.

The Hein-Lehmann radial screen in the cone circuit, distributed in the U. S. by the Nolan Co., receives slurry from the clean-coal desanding screen. A stainless-steel wedge-wire section in the flume leading to the radial unit drops out some of the water and sand while the remainder enters the radial screen. The only moving part is the rotary cross distributor which is propelled by the entering pulp, hence no drive is required. The distributor allocates equal amounts of constant grain composition to each partition of the radial screen. Freshwater sprays continuously wash the slurry as it flows across the wedge-wire screens. Oversize silt joins the overflow of the main sand pump to be pumped back to the raw-coal screens. The sand and water passing through the screen is returned to the cone circuit.

The bowl desiltors in the fine-coal circuit eliminate slimes from the table feed which results in improved dewatering and drying of the clean fine coal. Each desiltor essentially consists of a flat bottom thickener tank 40 ft in diameter. A 4-arm revolving rake fitted with plows mounted at the proper angle moves settled solids from the center toward the periphery of the tank. This deslimed product is removed from the desiltors by a standard rake classifier. Overflow of the desiltor contains about 3% solids, all of which is minus 100 mesh and 80% of it is minus 200 mesh. This material flows by gravity to the refuse sump.



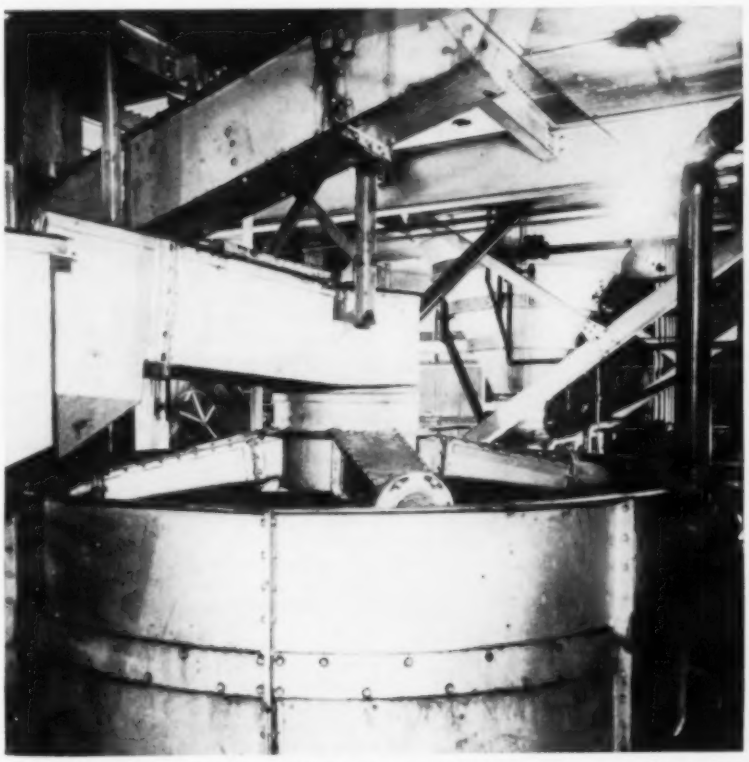
BOWL DESILTORS eliminate minus 100-mesh fines from table feed for improved dewatering in centrifugal filters. Higher capacity in heat dryers is another benefit derived from desliming the feed to the washing tables.

Desliming and desilting improve efficiency

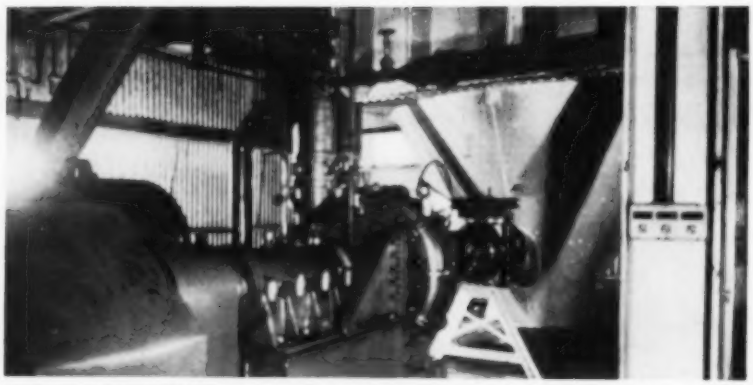
Feed to the desiltors is taken from the silt sump which receives the underflow of the raw-coal sizing screens and the silt removed by the radial screen from the coarse-coal circuit. This combined material is pumped to the top of the plant and passed through a splitter box to feed the two desiltors. The deslimed raw coal removed from the desiltors is fed by gravity to a 9-way revolving distributor which splits the stream to provide feed for two banks of nine tables each.

Clean coal from the tables, devoid of slimes, flows by gravity to a second distributor, a 5-way unit, which serves the Bird solid-bowl filters. Four of the Bird units have sufficient capacity to handle the load, the fifth is a standby unit permitting scheduled maintenance of the line.

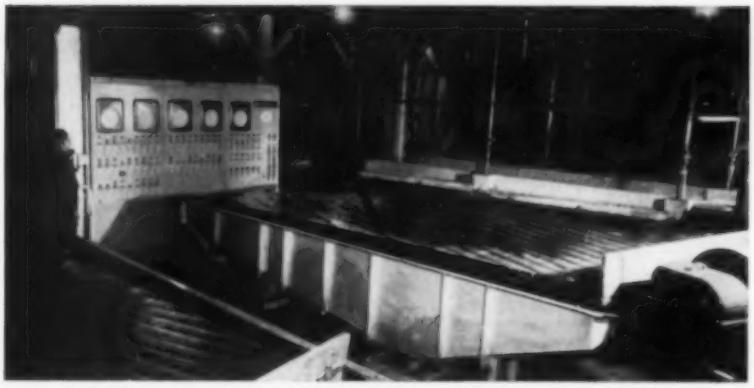
Absence of slimes in the feed to the filters promotes better dewatering, the cake averaging 6.5% surface moisture as mentioned. As a result, the capacity of the heat driers is increased considerably, thus raising the capacity of the plant from an initial design figure of 600 tph to an actual performance of 800 tph. Incidentally, the raw-coal facilities, including the storage bins and the 54-in plant-feed conveyor are designed to permit eventual expansion of the plant to a capacity of 1,200



STREAM OF SOLIDS AND WATER entering radial screen is evenly distributed through four arms. Oversize is recovered coal, undersize is sand for cone sump.



8-IN REFUSE PUMPS, one active and one standby, propel minus 2½-in reject through 400 ft of pipeline into disposal area.



CLEAN-COAL AND REFUSE SLUICES from 18 coal-washing tables are made of long-life, solid stainless steel, which also provides "slideability."

Suppliers of Corbin Equipment

Washing Tables & Distributors	Diester Concentrator Co.
Filters	Bird Machine Co.
Desiltors	The Dorr-Oliver Co.
Chance Equipment	United Engineers & Constructors, Inc.
Raw Coal Feeders	Jeffrey Manufacturing Co.
Magnet	Magnetic Eng. Mfg. Co.
Track Scale	Howe Scale Co.
Elevator	Haughton Elevator Co.
Crusher (clean coal)	American Pulverizer Co.
Crusher (refuse)	McLanahan & Stone Corp.
Oil Spray System	Viking Machinery Sales
Paddle Mixer	Link Belt Co.
Crusher (R-O-M)	McLanahan & Stone Corp.
Samplers	The Galigher Co.
Platework	Robert Holmes & Bros. Inc.
Screens (raw)	W. S. Tyler Co.
Screens (clean coal)	Allis-Chalmers Mfg. Co.
Screens (refuse)	Lecco Mchy. & Eng. Co.
Pumps (refuse)	Morris Machine Works
Car Shakeouts & Hoists	Allis-Chalmers Mfg. Co.
Belt Scales	Builders-Providence, Inc.
Slurry Screen (radial)	Hein, Lehman & Co. (Nolan Co.)
Dryers	Link Belt Co.
Air Compressor	Chicago Pneumatic Tool Co.
Inter-communication System	Femco, Inc.
Corrugated Asbestos Siding	Keasbey & Mattison Co.
Dust Collectors	American Air Filter Co.
Furnaces	Bigelow-Liptak Corp.
Stokers	Riley Stoker Corp.
Car Retarders	Union Switch & Signal Co.
Motors & Controls	General Electric Co.
Plant Design	Allen & Garcia Co.

tph, clean coal. Reject consistently averages 10%.

Thermal drying equipment, consisting of three Link-Belt Multi-Louvre dryers and auxiliaries, is installed in a separate open-type structure. Dewatered coal from the Bird filters is delivered by belt conveyor to drying plant surge bins and by screw conveyor from the surge bins to the dryers. Fine coal in the exit gases is trapped out in dry collectors and the stream then is scrubbed in secondary wet Rotoclones. Dry dust from the primary collectors is returned either to the furnace feed bin as drying fuel or to the product. Fly ash from the wet collectors is pumped to the main refuse sump.

Auxiliaries in the drying plant include coal pulverizers which prepare fuel for the furnaces. Fine coal from the primary collectors may be selectively deposited into this fuel system when loading it with the product would create an objectionable dust condition in the clean coal. However, a Viking oil-spray system is in service to allay the normal dust in the clean coal when desired.

Refuse from the coarse- and fine-coal circuits and the secondary collectors in the drying plant is collected in the main sump. Chance-cone refuse in the 4x1¾-in size range is crushed to minus 2½ in before it is deposited in the sump. The total plant reject, about 80 tph, then is pumped to the refuse area with 3,000 gpm of water through 400 ft of 8-in pipeline by an 8-in Morris dredge pump. The pipeline is made of USS Man-Ten, a manganese-copper steel offering the high abrasion-resistance required in this application.

Ground was broken for the new plant in August, 1954, and the first coal was processed in October, 1955. This was somewhat earlier than the target date, but circumstances made it necessary to run coal through the plant while final construction was completed. U. S. Steel's preparation manager, Paul L. Richards, points out that in spite of this unexpected start fewer bugs were encountered than might ordinarily be expected. In December, 1955, all facilities were in operation.

The use of special steels was decided upon early in the planning stages. Meetings were arranged among contractors, designers and U. S. Steel engineers and operating men to determine the grades of steel to be used to secure the desired advantages of low cost and long life. The decisions thus derived were then written into specifications for the equipment manufacturers.

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there is a style and bit size for every drilling operation

Special grade carbide and effective bit design combine in Kennametal Drill Bits to assure fast drilling and long service life. Their smooth cutting action reduces maintenance costs for bits and drilling equipment, and lowers power consumption. Kennametal's complete line provides the right bit for every drilling condition.

STYLE D BITS

are for drilling coal and rock under widely varying conditions.

STYLE DK BITS

with strong, short prongs and large Kennametal tips, are for drilling in tough formations.

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with hexagonal shanks, are recommended for larger, mounted-type drilling machines and for drilling holes for various blasting devices.

STYLE DL BITS

are for faster drilling seams comparatively free of impurities, especially in more brittle coal formations where coring is unlikely.

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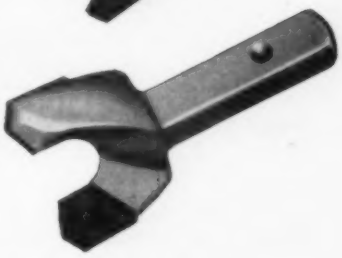
with core breakers, are for drilling "mother" coal or other soft materials where cores are frequently formed.

STYLE RD BITS

have short prongs for drilling slate, shale and coal with many impurities.



All styles are available in many different sizes to meet different drilling conditions and penetration requirements.

Your Kennametal representative will gladly show you these versatile, economical drilling bits. Let him help you select the right one for each drilling operation. KENNAMETAL INC., Mining Tool Division, Bedford, Pennsylvania.

Ask about Kennametal Cutter Bits, Roof Bits, Drill Bits, Augers, Pinning Rods, Accessories.

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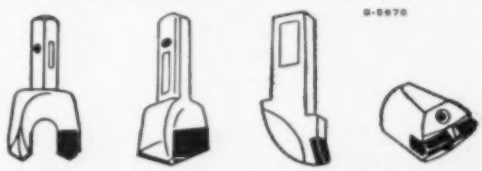
INDUSTRY AND KENNAMETAL ...Partners in Progress



DRILL BITS ROOF BITS MACHINE BITS ROCK BITS

FOREMEN'S FORUM

CONTINUOUS MINERS and loading machines have maximum production capabilities that have not been tapped. Striving to realize some of this potential productivity is the supervisor's best contribution toward keeping his mine com-

Applying a Reverse Twist To Get Higher Productivity

Sometimes you can get more out of the loading unit by ignoring it while you eliminate bottlenecks elsewhere in the system. Increased productivity will result from your effort.

WHEN TOP-MANAGEMENT'S ANALYSIS of a coal company's prospects for growth leads to a decision to open a new mine, you can be sure that the best available engineering talent will be marshalled to design the entire plant for maximum efficiency. Modern equipment that will operate best under the prevailing conditions will be selected. The capacity of the cleaning plant will be matched to that of the mine, with intelligent tolerances for future expansion of either or both. This was true when your mine was opened.

However, the day the mine opens, obsolescence rears its ugly head since new types of equipment for doing mining jobs better are announced almost every day. Resisting this drift toward obsolescence is one of the major duties of mine supervisors. We propose, therefore, to discuss ways and means of generating this resistance, which is the only way to keep older mines competitive with newer ones.

Fortunately, there is a surplus supervisors may draw upon in seeking higher efficiency. This surplus is the unrealized productive capacity of today's loading machines or continuous-mining machines. There are numerous instances on record to show how more and more of this untapped capacity may be realized. Sometimes, these steps toward higher efficiency appear to be quite remote from the mining machine. Nevertheless, most of them derive their value from the fact that they add a few more minutes to the actual operating time of said machine.

In setting the limits for our discussion this month, let's make this one point: Without good maintenance, aimed at preventing unscheduled breakdowns of face machines, all other efforts will provide disappointing results. The optimum in maintenance is described in the article entitled "Productive Maintenance" in this issue of *Coal Age*. Assuming this quality in maintenance prevails, let's go on from there.

Areas of responsibility should be assigned at the outset. We know the mine foreman and mine superintendent are vitally interested in what goes on in the producing sections, but the section foreman or face boss is most familiar with day-by-day section operations. He should constantly search for section improvements that will result in immediate increases in productivity.

The area of primary responsibility of the mine foreman includes all workings from the section loading point or panel-

LAYTEX® ROYAL MASTER PORTABLE CABLE

L. G. Bishop, supt. of underground operations of De Bardeleben Coal Corp., Sipsey, Alabama, says "U. S. Royal Master's performance is better than any other cable we've used in our 'low coal' operation."

Here's an off-track coal-cutting machine being used in the mine's 23½" coal seam. The U. S. Royal Master Trailing Cable is pulled along behind it, since no reel can fit into this space.

Coal-cutting machine, track mounted, is shown travelling through a heading. Note the U. S. Royal Master Trailing Cable coiled on the reel. The Cable is hooked to a tap on the trolley line.

"Toughest, most flexible trailing cable we've ever used in our mines,"

says gen'l superintendent

"In fact," continues Mr. L. G. Bishop of De Bardeleben Coal Corp., "the U. S. Laytex Royal Master Trailing Cable undergoes the roughest service you can think of. Because of the low roof in our mine, many of our cutting and loading machines cannot carry a reel. That means the full length of the cable (over 400 feet) is dragged and yanked over rough, sharp-edged stones and through wet areas."

Mr. Bishop and his fellow officials of the mine also like U. S. Royal Master's flexibility; *a stiffer cable would crack or break when pulled from its coil.*

"What's more," says Mr. Bishop, "U. S. Royal's resistance to cuts and bruises makes it valuable in resisting short circuits. It's the smoke from short circuits that drives the miners from their working areas. That's one more reason why we plan to convert completely to U. S. Laytex Royal Master Trailing Cables."

These "U. S." Cables are obtainable at your "U. S." branch, your distributor, or write us at Rockefeller Center, New York 20, N. Y.

Electrical Wire & Cable Department

United States Rubber

IDEAS LIKE THESE, a low-seam pit-car loader (left) and lightweight supports for installing line curtains in roof-bolted openings can have a beneficial effect on production from the face machines. Top-notch services are a big help.

Delay-free loading depends upon delay-free haulage and service

belt discharge to the slope bottom or other underground landing point. And the superintendent takes over there and follows through to final-loading operations at the preparation plant. This is an arbitrary breakdown of responsibilities; we realize there may be overlapping interests.

Later on in this discussion we shall quote actual case histories of how these duties were fulfilled, but right now we would like to set up the word *capacity* as our major theme. The full potential capacity of the loading unit is what we mean. There is a reverse twist evident here. We notice that most increases in face productivity, with existing machines, are achieved when the supervisor starts checking his area of responsibility at the outby end and works toward the face.

This is a process of eliminating bottlenecks in the system in preparation for trouble-free handling of the increased production that will naturally result when these bottlenecks have been cleared. Working this way is easier and less confusing than trying to push a surge from the face toward the portal. When a mountain is to be moved, it's easier to cut the job down to size from the near side, rather than getting behind the mountain for one big push.

Here are some examples of how these methods paid off in increased operating time for the face machine:

Shorter Haul for Shuttle Cars—At an Indiana mine, entry-development work in a thin seam was slowed down because of the difficulty of maintaining mine-car loading points close enough to the face to keep haul distance within reason. Too much time was consumed in taking down and rebolting the roof to provide headroom for shuttle cars with non-elevating discharge booms and in building shuttle-car ramps for over-the-side loading. The solution to this problem consisted of designing and building a self-propelled pit-car loader that could be reduced in height to 45 in to permit faster tramming to new loading points as these were prepared. Shuttle-car ramps were eliminated and roof cavities were prepared in the normal course of face operations. The immediate result was shorter hauls and more operating time for the loading machine.

Improved Ventilation – In Western Pennsylvania, continuous mining was improved through the development of a relatively simple jack which speeded the installation of line curtains in roof-bolted workings where no other supports were available for the curtains. Conducting sufficient air to the machine from a point distant from the face imparted a decided boost to the face cycle.

Shortstopping Cable Failures—A supervisor at a West Kentucky mine turned to the expedient of using a discarded rubber tire as a shock absorber at the anchorage point of a shuttle car cable. A Pennsylvania mine employs spad drivers to make roof suspensions for cables. Over a number of shifts, day in and day out, this cable preservation adds valuable operating time.

Patching Broken Rails—Derailments in track-haulage systems are real bottlenecks. Everything stops while repairs are made. However, one man came up with a successful clamp that will hold a broken rail in place until the rail can be replaced between shifts or off shift. The clamp can be applied in a jiffy.

Repairing Airline Leaks—Leaks occasionally develop in the mains carrying high-pressure air for coal breaking. One company cuts delays resulting from such leaks to a bare minimum by keeping high-pressure copper tubing on the section. The copper is slightly longer than the sections of steel tubing used in the line and is fitted with end adapters to permit connection to the steel. A leaky section may be replaced in short order and permanent repairs are made off shift. Again, precious minutes are saved at the loading machine.

Increasing Shuttle-Car Capacity—Bigger loads can be placed on shuttle cars if sideboards made of discarded conveyor belt are attached. Furthermore, these sideboards can yield without breaking in passing minor fluctuations in roof clearance. More coal on each trip adds up to more productive time for the loader.

These six ideas show how it is possible to increase loading time by eliminating bottlenecks in the outby workings. It isn't necessary to stand at the face racking your brains over the loading machine. Remember, the loading machine or continuous miner probably has more overcapacity in today's applications than any other unit. Your best possibilities for improving unit productivity lie elsewhere.

If you are a section foreman, start at the loading point and work toward the face. Take note of all unnecessary pileups of coal and take steps to eliminate their causes. Can you eliminate doors and curtains in shuttle-car haulways? Are untidy supply piles hindering the travel of face machines? Do bad roadway conditions tie up your shuttle cars? Taking action to eliminate drawbacks like these ultimately is reflected in higher tonnage.

Similarly, the mine foreman and superintendent can examine their areas of primary responsibility, being careful to start at the outby end of the system and work in.

Let's see why

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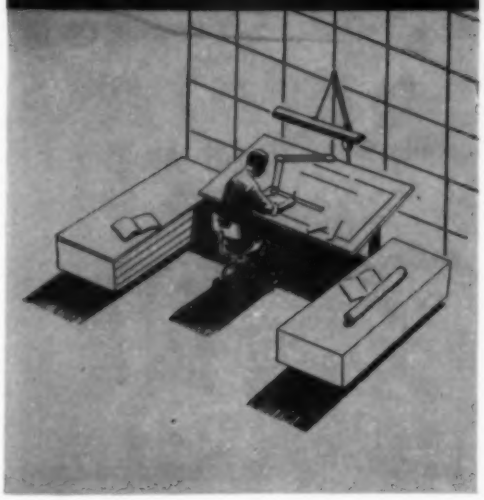

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FAIRMONT–built means that here is a cleaning plant correctly engineered and properly equipped to meet tomorrow's needs as well as today's.

FAIRMONT–built brings a trained pilot crew to operate the new plant and train permanent operating personnel.

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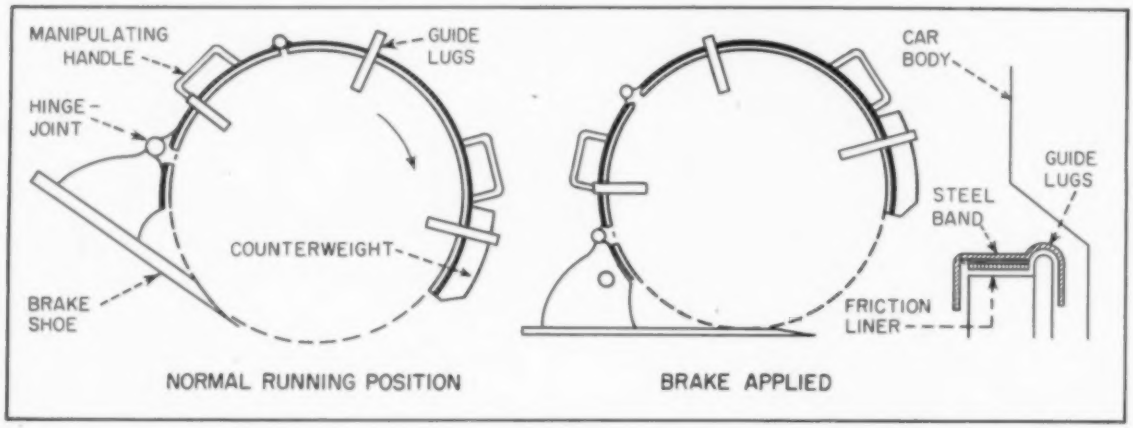
DESIGNERS AND CONSTRUCTORS OF COMPLETE COAL PREPARATION PLANTS USING BOTH WET AND DRY CLEANING, CENTRIFUGAL AND THERMAL DRYING.

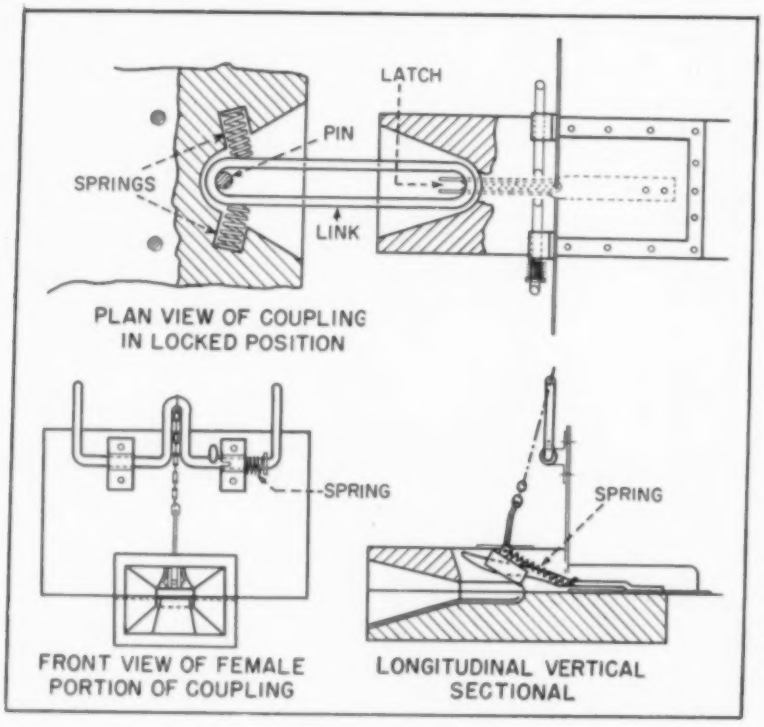
OPERATING IDEAS



Automatic Brake Prevents Runaway

BACKWARD RUNAWAY of mine cars in event of failure or accidental unhooking of a coupling can be prevented with an automatic braking device, according to a recent issue of *Iron & Coal Trade Review*. The device is designed so that it can be installed between the wheels and body of the mine car. It is claimed to hold a trip of 13 cars made up of 8-ton units on grades up to 3.3%.

Although the unit weighs 28 lb it can readily be adjusted or removed. It controls the brake shoe by keeping it in the off position so long as the car moves in normal direction. If the car runs backward the device forces the shoe between the wheel and the rail to stop the motion of the car.



Automatic Coupler Makes Link Connections

SAFER coupling and uncoupling of mine cars is possible with a mechanism invented and patented by John L. Day, Keokee, Va. His device eliminates the hazards inherent to coupling or uncoupling cars by hand. Coupling is automatic and uncoupling can be done without stepping between cars. Featuring simplicity and ruggedness, the device aligns the connecting numbers regardless of the curve or grade of the track.

An ordinary open link is held at right angles with the bumper on one end of the car and a pivoted latch is mounted in the coupling block at the other end. The coupling block has a funnel-shaped opening which guides the link of an approaching car into position where it will be automatically held by the latch. Gravity and the force from a spring are combined to hold the link. To uncouple the car, the handle of the uncoupling lever is raised. Located within easy reach, the lever can be operated from the side of the car.

Reinsulate with U. S. Uskorona and "D. R." Tapes

A cable becomes as good as new when you reinsulate with Uskorona and re-jacket with "D.R." splicing compound. The "D.R." compound provides an outside vulcanized covering. These completely reliable tapes give:

- Extra-tight grip plus high tensile strength.
- They stand up under acid, alkalies and moisture . . . ideal for mining machine cables.
- Dangerous leaks can't occur, because pinholes are impossible.
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Get in touch with any of our numerous distributors or one of our 28 District Sales Offices, or write to us at Rockefeller Center, New York 20, N. Y.

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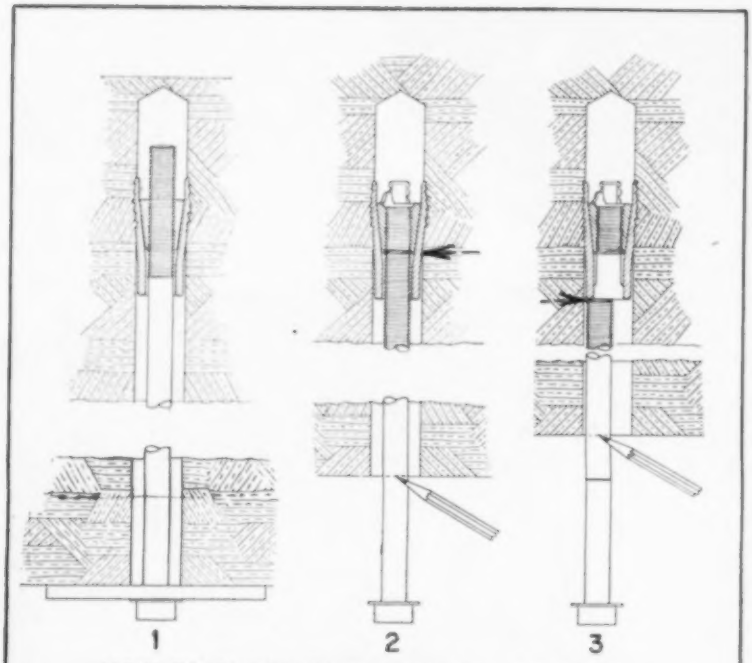

HOW TO CHECK THE POSITION OF PLUG IN EXPANSION SHELL

How to Check Bolting Procedures

REGULAR on-the-spot checks are an important part of any well-planned bolting program. To make sure that each section of the roof is supported properly, frequent checking on the bolts installed during each shift is necessary.

Size and shape of bolt holes may be adversely affected by changes in roof conditions and failure to make the proper adjustments of drill speed, rate of feed, or by worn bits. Torque of the tightening device may vary from the recommended value and thus bolt tension may be above or below the standard value. A third critical factor is the relative positions of the plug and shell after installation.

The following procedures, appearing in a recent issue of *Haulage Ways*, are excellent in checking the variables that determine the strength and efficiency of an expansion-type bolt in mine roof.

1. Hole size—the smaller the hole diameter, the greater the holding strength that can be developed by an expansion unit, especially in soft rock. In an oversize hole, part of the valuable expansion is lost in "taking up the slack" between the shell and the wall of the hole. The only sure way to check hole size is to use a hole gage, such as, the O-B Basic Hole Gage. Regular checks during each shift will detect rifling or an oversize hole and thus show when to change drill speed or rate of feed.

2. Torque—a torque wrench should be standard equipment for each bolting crew or section foreman. Periodic checks on installed bolts show if tightening equipment is maintaining the proper torque. If 150 ft-lb is established as a standard, a reading of 125 or 200 ft-lb shows that bolts are not being tightened properly.

3. Position of plug in the expansion shell—this requires the removal of a completely installed bolt. This should be done with a hand wrench since a power wrench might disturb the position of the plug in the shell. The bearing plate is removed and one side of the bolt is coated with chalk for a distance of about a foot above the head.

The bolt then is re-inserted in the same hole. When the end of the bolt touches the plug, make a pencil mark on the chalk at the level of the roof as shown in the accompanying sketches. Next touch the end of the bolt to the bottom of the shell, and make a second pencil mark. The distance between the two marks is the distance between the end of the plug and the end of the shell.

If the lines are close together, the plug is close to the end of the shell and very little expansion reserve remains. Bolt tension, in such a case, is probably near the maximum possible because of soft roof or an oversize hole. If the lines are not close together, then there is ample reserve expansion left.

The results of this test can be used as a guide for improving or maintaining the bolting procedure.

Weight Reading At a Distance

THE MAN IN THE ILLUSTRATION is an underground rotary-dump operator at Isabella mine, Weirton Coal Co., Isabella, Pa. Peering through this telescope, which was salvaged from a surveyor's instrument, permits him to read the distant dial of a direct-reading mine-car scale. The dump handles 10-ton mine cars and the scale is situated five car lengths back from the dump to allow room for the mechanism under the track.

In preference to installing any sort of remote indicator to relay the car weights to the operator's desk, Isabella officials simply installed the telescope, making it possible to read the scale at a glance.

Splice Any Size Trolley Wire Faster With This O-B Hollow Screw Splicer

- 2-piece hollow screw splicer design fits easily over trolley wire bends and burrs.
- Two different size wires are quickly, easily spliced together (takes only a minute to level them off with a file).
- Insures a smooth underrun with any size Figure 8, grooved, or No. 9 Section wire.
- Permanent holding strength up to 4000 pounds.

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4 hollow screws tighten quickly and easily.

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Feeder and Trolley Materials • Control Materials • Trolley Shoes
Roof Bolt Shells and Plugs • Rail Bonds • Automatic Couplers

O-B Bail-Type Shells and Plugs

Speed up Bolt Installation

"They Go Up Easy and They Stay Put!"

- Bail allows shell fingers to flex against hole wall, eliminating hang-ups in the hole and preventing bolt from falling out before wrenching.
- Factory assembly insures correct positioning of plug in shell for maximum expansion, maximum holding power.
- All units coated with rust preventive and shipped in husky cartons to reach the face just as they leave the factory.
- Available for ⅝-inch and ¾-inch bolts.

Left-Small O-B Bail-Type for ⅝-inch bolts. (Catalog 22435)

Right-Large O-B Bail-Type for ⅝-inch bolts, (Catalog 22363) and ¾-inch bolts (Catalog 22378)

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Feeder and Trolley Materials • Control Materials • Trolley Shoes
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Power

at your fingertips!

- It's no bigger than the palm of your hand, yet this O-B Rail Clamp carries up to 400 amps all day long without overheating—and does it when clamped to scale and rust covered rail, too!
- Attaches to rail by means of a "built-in" wrench fastened right on the head of the heat-treated set screw through which contact is made.
- Swivel action allows high-strength aluminum-bronze handle to turn 180 degrees then flop over to continue tightening—forcing cup-shaped tip of set screw into positive contact with "bright" metal of rail.
- Bronze cable connection holds cable sizes from No. 14 to 2/0. Clamp itself fits on base of any rail up to 100 pounds.
- Order Catalog 22461.

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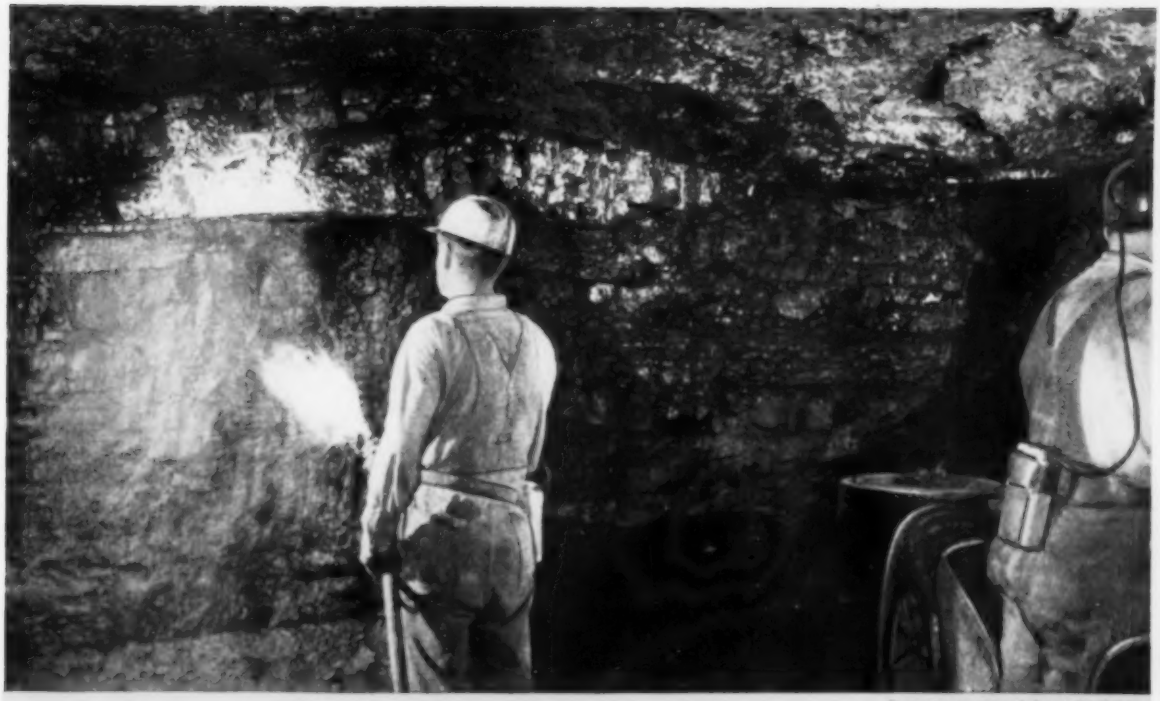
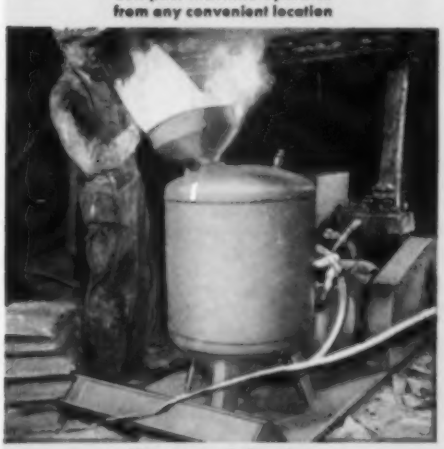


Operator sprays right at the face with Manson WET Rock Duster

Now . . . ROCK DUST at the FACE WHILE You Cut Coal

Compact machine operates from any convenient location



Note ease of charging the machine by operator

One Man Operation . . .
No Stoppage or Interference with Operations

Undercut, drill or load while rock dusting with the Manson WET Rock Duster. There is no dust. Mixing is done at the machine at a convenient distance away. A pre-mix of regular rock dust and water is supplied under pressure to the Manson fan-spray, cast brass nozzle. Operator merely opens and closes the light-weight, well-balanced nozzle valve. No adjustment or regulation is required. There is no drip, nothing plugs up. Operator does not tire because there is no kick or fight at the nozzle.

Does BETTER Job

The patterned spray of the Manson WET Rock Duster covers evenly and completely as the nozzle is moved in easy swings. Bounce or drip of the spray off walls or ceiling is practically eliminated. The precise mixture of dust and water at the machine gives a consistency which makes the solution cling to exposed coal surfaces. Coverage is greater and dusting costs less with a Manson. BM approval No. 2-1139.

Write for literature, specifications, and locations where you can see Manson WET Rock Dusters at work.

Sold exclusively by

MOUNTAIN STATE EQUIPMENT COMPANY

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Box 1050, Phone 8700

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EQUIPMENT NEWS

Trailer Rated At 95 Cu Yd

The world's largest bottom dump hopper trailer, a 66½-ft unit with a rated coal-carrying capacity of 95 cu yd, or approximately 70 tons, has been constructed in Marion, Ohio, by the Marion Metal Products Co. for the Beckley Coal & Coke Co., Nicholas County, W. Va. Powered by a 400-hp diesel tractor (Kenworth Model 803), the trailer will carry more than 100 cu yd heaped, according to the manufacturer.

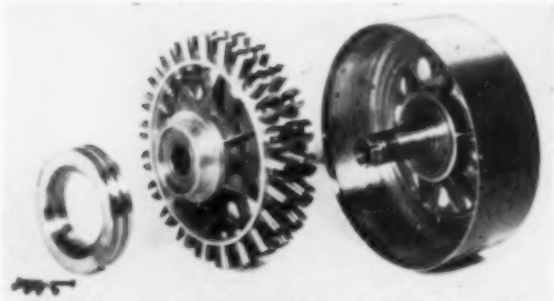
Empty, the Marion trailer weighs 47,700 lb. Hitched, the trailer and its tractor weigh 98,600 lb, or nearly 50 tons. Loaded, the trailer, tractor and coal will scale more than 238,600 lb, or about 119 tons.

The unit dwarfs most of those in operation now, although a number of 50-ton hoppers are being used in strip operations. It surpasses, too, a British model rated at 66 tons (*Coal Age*, August, 1956, p 132) and a 60-ton unit being used in the United States.

Both gravity and air are used to open and close the Marion trailer's pair of ⅜-in steel, bottom dump door panels (24 ft x 2 ft). A 10-in diameter air cylinder with a 24-in stroke controls closing. A 4-in diameter cylinder with a 5-in stroke trips the doors to open them and initiate gravity dumping.

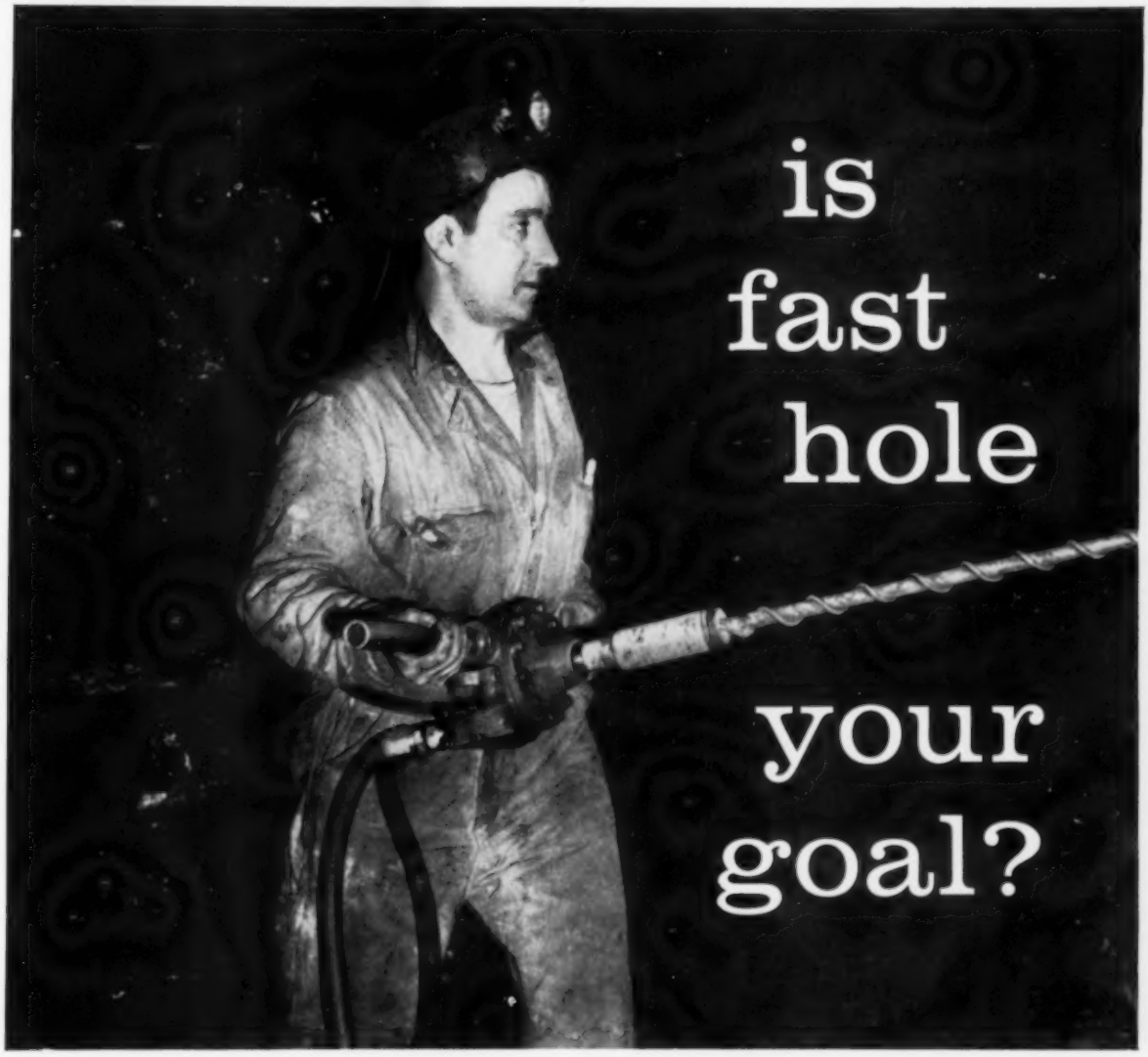
Fabricated to withstand 4,000 to 5,000 lb psi, the trailer's panels are made of tensile steel. (Side panels, 8 gauge; bottom panels and rear shield, ¼ in; front panels, ½ in.) Other statistics underline the trailer's massive 47½-ft length, 12-ft width and 13½-ft height, e.g., it rests on a 10½-in, 6,500 lb, solid, square axle turned down to 8-in diameters at the ends; the axle is rated at 100,000 lb; tires, 18.00 x 33 in, are 6 ft high and weigh 965 lb each; wheel bearings with rollers over an inch in diameter have 8-in inside diameters, 12½ in outside diameters; and the free-turning universal hitch has a capacity of 80,000 lb.

Kenworth's 803 tractor, with its Cummins V-12 diesel, torque converter and semi-automatic transmission, is the largest standard model being produced by the Seattle, Wash., company. Matched to maneuver with Marion's trailer, the tractor's front axle is rated at 50,000 lb, its rear axle, at 95,000 lb. The full floating, double reduction, planetary rear axle is equipped with 8-in wheel bearings. A power steering system includes a main cylinder that exerts a force of 15,000 lb.



Canadian Drive Being Sold Here

Whitney Chain Co., Hartford, Conn., has been licensed to manufacture and sell the magnetic drive (and later, the variable-speed speed reducer) of Tormag Transmissions, Ltd., Vancouver, B. C. The Whitney-Tormag magnetic drive provides a flexible, slip-type drive up to 50 hp between a motor and its load. The unit consists of two component parts—a magnetic rotor to which Alnico V permanent magnets are attached; and a bimetallic rotor, copper-faced and perforated with steel rivets. In basic form, the two rotors are mounted face to face with an air space between them. If either is driven a torque is induced in the other by eddy currents; the permanent magnets supply the magnetic flux. Whitney Chain says the driving and driven rotors never touch. The company lists these advantages: 1) shockless, vibration-free drive; 2) no mechanical or fluid coupling and no contact between driver and driven parts except through the bearings; 3) smooth pickup for heavy, un-



Get a CP Hydraulic Coal Drill!

SAFE AND EASY TO HANDLE

- NO SPARKS
- NO SHOCKS
- NO KICK OR STALL

You just can't beat the lightweight CP-35-HCD Hydraulic Coal Drill for fast hole drilling . . . *it drills 9 foot holes every 30 seconds in hard seams!* Its high torque motor delivers the power bonus and has the response needed for hard drilling in tough seams.

And more! The auger runs at optimum speed to minimize vibration and make long lengths of auger easy to hold. The CP-35-HCD can be run from the power system of cutting, timbering or roof bolting machines. A complete line of accessory equipment . . . valves, gauges, junction blocks, hoses and fittings is available. *Chicago Pneumatic Tool Company, 8 East 44th Street, New York 17, N. Y.*

Chicago Pneumatic

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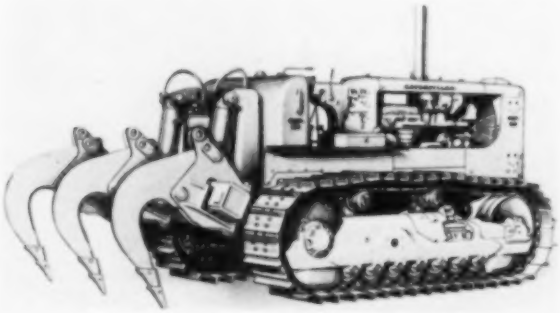
balanced loads; 4) no wear and thus no maintenance; 5) high efficiency at rated (95%) horsepower; 6) no additional wiring expense; 7) unaffected by temperatures from −60 deg F to 250 deg F; 8) fully reversible, and 9) use as a dynamic brake. The unit's design permits it to be applied to a range of transmission problems covering synchronous drives: variable speed–variable torque output, or variable speed–constant torque output.

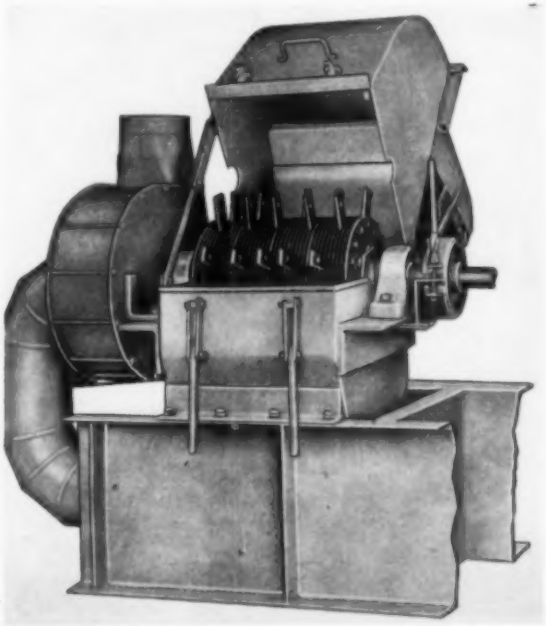


Control A Key Feature Of Ripper

Increased maneuverability, better control of ripping depth and extreme utility are the important features of the new D9 ripper, according to the manufacturer, Caterpillar Tractor Co., Peoria, Ill. Designed specifically for use with the D9 tractor manufactured by Caterpillar, the ripper is constructed of two mounting brackets,, two hydraulic cylinders, one beam assembly and three teeth. Its weight is 10,830 lb. It is mounted on the bevel gear case through a special drawbar bracket group that replaces the standard drawbar brackets. The hydraulic cylinders and controls permit a ripping depth to 28 in. Teeth are swivel mounted "to roll with the punches," says Caterpillar. A "live drive" hydraulic pump raises and lowers the unit independently of the flywheel clutch or torque converter. Another control feature is an automatic kickout that throws the hydraulic control lever to "hold" position at the end of a "raise stroke."

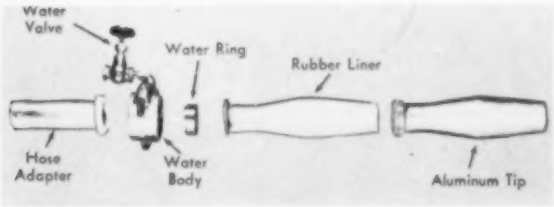
Lift Rated At 25 Tons

An increased rating (25 tons) and a new chassis equipped with the Clark power train are the chief features of the T-24 Michigan excavator-crane introduced by the Construction Machinery Div., Clark Equipment Co., Benton Harbor, Mich. Its vital statistics: a gross vehicle weight of 51,000 lb equipped as a crane (reduced to 41,500 lb when stripped for highway travel); a maximum boom length of 100 ft (formerly 80 ft); job booms 15 to 30 ft long. The unit's power train consists of a five-speed transmission, a two-speed transfer case and planetary wheel driving axles. Equipped with a 160 bhp gasoline chassis engineers at the Myers-Sherman Co., Streator, Ill. In the For engine maintenance Clark has extended the unit's hood flush with the right forward side of the truck. A side door permits entry to the engine compartment. The crane's upper mechanism has been increased from 94 to 104 bhp, has air-controlled shaft and drum clutches.



Hammermill Grind Range Increased

An industrial hammermill with a hammer arrangement that permits a wide range of adjustment has been designed by engineers at the Myers-Sherman Co., Streator, Ill. In the arrangement there are two rows of holes in circles on the rotor plates. By placing hammers on the outside row the increased hammer tip speed and reduced clearance between the screen and the hammers permits fine or finish grinding. For coarser grinds, fewer but larger hammers are used. These are attached with pins to the inside row of holes. The result is slower tip speed, greater clearance and fewer impact points that produce large, uniform particles. The unit's rotor is designed to operate at a hammer tip speed of approximately 25,000 ft a minute.



Dusting Unit Doubles As Fire Fighter

The M-S-A wetdust nozzle, used in combination with the Bantam "400" duster, combines rock dust with water for application in slurry form. According to the manufacturer, Mine Safety Appliances, 201 N. Braddock Ave., Pittsburgh 8, Pa., the nozzle and the duster permit rock dusting up to the working face during shifts. The surry is not recommended for a floor, since it will create a slippery condition. M-S-A points out that the same slurry is useful as a fire fighting medium. In operation the wet dust nozzle is attached to a standard discharge hose of the Bantam "400" with a hose clamp. A water line with a minimum flow of 10 gpm and pressure of 50 lb psi is attached

B.F.Goodrich

PENNSYLVANIA coal hauler gets 6,000 hours' service from BFG tires.

VIRGINIA miner reports BFG tires can be recapped where others failed.

MINNESOTA iron miner finds BFG tires defy chunks of abrasive rock.

KANSAS miner uses BFG tires to pull 80-ton "hopper cars" out of pits.

These miners save money with BFG tires —here's how you can, too!

A PENNSYLVANIA coal stripper reports B. F. Goodrich Universal tires have given 6,000 hours of service, including recaps. Tire trouble at a Virginia mine used to stop production, run up costs. Then the company switched to BFG tires, now reports their tire problems licked. On a Minnesota ore road or pulling out of a Kansas open pit, B. F. Goodrich tires defy dangerous rock cuts.

These reports are typical of what mine operators all over the country find: B. F. Goodrich tires wear longer and reduce operating costs. Extra-thick tread on the Universal resists cuts and bruises. And under the tread is the B. F. Goodrich *all-nylon* cord body.

Nylon is stronger than ordinary cord materials, withstands double the impact and defies heat blowouts and flex breaks. That's why the B. F. Goodrich *all-nylon* cord body outwears even an extra-thick tread, *can still be recapped over and over*.

Your B. F. Goodrich retailer has a tire for every kind of mine work. Let him show you the one that will wear longer and save you money. Or write *B. F. Goodrich Tire Company, A Division of The B. F. Goodrich Company, Akron 18, Ohio.*

Specify B. F. Goodrich tires when ordering new equipment

B.F.Goodrich

Your B. F. Goodrich retailer is listed under Tires in the Yellow Pages of your phone book

to the nozzle. As dust and air enter the nozzle from the dust hose, a fine spray of water is directed through it, wetting the dust before it leaves the nozzle.

Aluminum Boosts Trailer's Payload

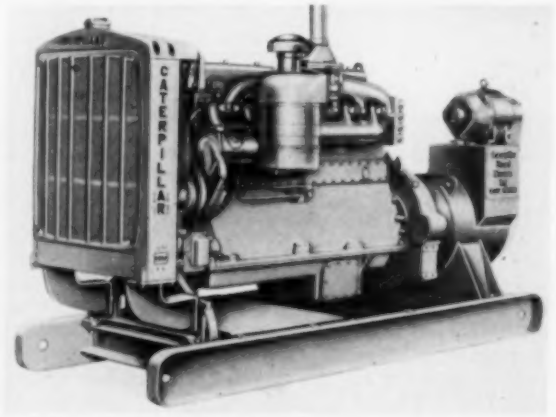
In a departure from traditional steel construction, Perfection Steel Body Co., Galion, Ohio, has fabricated an all-aluminum dump trailer that eliminates 2,000 lb of dead weight, according to the Aluminum Company of America, supplier of the trailer's metal. The trailer is 20 ft long, 8 ft wide, 4 ft high and is constructed of $\frac{3}{16}$-in welded aluminum sections. Alcoa's 5154-H32 alloy was used because of its "weldability" and strength after welding, the company says. Not only is dead weight eliminated, Alcoa maintains, but painting is not required since the aluminum is corrosion-resistant.

Runs All Day On 1½ Gal

The gasoline tank of a three-wheeled British truck named the Motocart holds only 3 gal, but you won't need more than that during a full 8-hr day. In fact, according to the distributor in this country, Linden Equipment Corp., 119 So. Robertson Blvd., Los Angeles 35, Calif., the 1½-ton Motocart uses a mere 1½ gal of gasoline during 8 hr of operation. The maker, Britain's Oppermore company, has powered the Motocart with a single cylinder, four-cycle air-cooled motor, and has mounted the engine, transmission and steering on the front wheel. Thus, such parts as a drive shaft, universal joints, differential, steering and transmission linkage are eliminated. In line with the feature of one-man operation, the Motocart is equipped with a "leader control" that operates both brake and clutch, making it possible for a driver to load the vehicle as it moves. Its steering wheel can be locked in any position—straight driving or turning. And, because the Motocart pulls rather than pushes its "up-front weight," the unit will move through mud, soft sand and clay with a full 1½-ton load without difficulty, according to Linden Equipment.

Built For Loads To 3,500 Lb

Scoot-Crete, the three-wheeled carrier above, can be loaded, driven and dumped by one man, according to its manufacturer, Get man Bros., South Haven, Mich. The unit will carry loads up to 3,500 lb at speeds 12 to 15 mph and is designed to turn in its own length. The maker also says that Scoot-Crete has the power to climb grades up to 25% and that a locking brake lever will hold the unit "positively immobile." Powered by an air-cooled Deutz diesel, the Scoot-Crete is recommended by the manufacturer for use inside, outside and underground.



Self-Regulating Electric Set

Caterpillar Tractor Co., Peoria, Ill., has added a 100-kw, self-regulating diesel electric set to its line of power generating equipment. Designated the D342 the unit is equipped with a self-regulated generator that avails itself of the principal advantages of previous self-regulated and externally-regulated gen-

(Continued)

"Much less down time than any other equipment I've ever owned"

The CAT* D13000 Engine in this Gardner-Denver compressor operates more economically than the gasoline engine-driven compressor it replaced and has twice the air capacity. It is owned by Roberts Coal Co. of Gallup, New Mexico, which also has a Caterpillar D8800 Electric Set furnishing power for the screening plant. "I've found that Caterpillar equipment is more dependable and has much less down time than any other I've ever owned," says Earl Roberts, owner. He operates the only coal strip mine in the state, producing 200 to 250 tons daily.

Excellent though this performance is, there's a new line of Caterpillar Diesel Engines and Electric Sets that are designed to do more work at even lower cost. The new D342, for example, replaces the D13000. It is a 210 HP (maximum output capacity) engine of compact, six-cylinder design. It operates without fouling on inexpensive, non-premium fuel such as No. 2 furnace oil. Like all Caterpillar Diesels, its four-cycle simplicity means that there are no cylinder ports or air boxes to clean. And it has such Caterpillar long-life features as highly effective fuel, oil and air filtration, "Hi-Electro" hardened cylinder liners and crankshaft, and aluminum alloy bearings.

There is a full line of Caterpillar Engines to 650 HP (maximum output capacity). Leading manufacturers can supply these rugged yellow units in their compressors, excavators and other coal mining equipment. Your Caterpillar Dealer can give you details—and help you select an engine if it's time to repower. See him soon, and count on him for dependable service and parts you can trust.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

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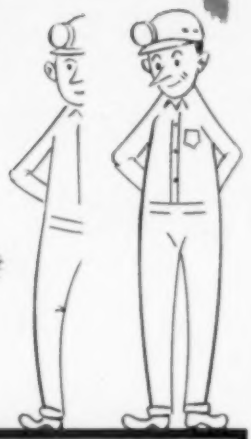
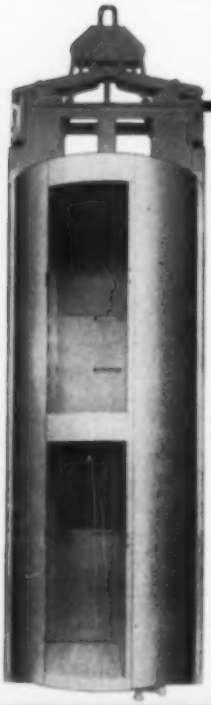
MODERN HEAVY-DUTY POWER

WHICH MINER WOULD YOU HIRE?





Naturally you would hire the whole man—even so, are you getting the most productive man hours from your section crews? . . . or are your men losing too much time traveling between the lamp house and the face? If the answer is "yes" then let us show you how you can quickly and reasonably install a speedy, safe Connellsville Automatic Man Cage nearer the face—a portable installation which can be moved to a new location, when necessary, with a minimum of time and expense. This man cage will cut travel time up to 50% per man—a big savings in time—a big boost in production when multiplied by individual crew members.

Custom-built to meet your requirements, the two-deck Connellsville Elevator-type Man Cage is fully automatic with push button controls. Installed complete with hoist, controls, counterweight and sheaves at a price lower than conventional methods and equipment.

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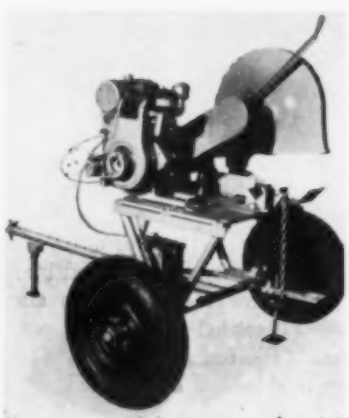
Equipment News *(Continued)*

erators. Voltage droop and terminal voltage are adjusted on the generator until the needs of an installation are met. Then the controls are locked, according to the manufacturer, and no further adjusting is needed. The generator is designed specifically to match the CAT D342 diesel and is expected by Caterpillar to match the diesel's life.

Rank Belt Strength With Steel Cable

A nylon-filled fabric reportedly as strong as steel cable is being used by B. F. Goodrich Industrial Products Co., Akron, Ohio, to construct conveyor belting. Goodrich says that a belt made with five plies of "Nyfil 120-RS," the fabric's name and designation, is as strong as a steel cord belt rated at 1,000 lb per sq in per ply. The company declares that it would require 20 plies of 42-oz cotton fabric to provide similar strength. Nyfil is a combination of rayon and nylon. It permits operating tensions up to 200 lb per in per ply width. In the past, tensions as high have been met by using steel cables for interior belt reinforcement.

Posing a hypothetical example to demonstrate the strength of Nyfil 120-RS, Goodrich says that a belt 42-in wide, carrying coal at a rate of 700 tph and traveling 600 ft per min can lift a load 852 ft in a slope length distance, pulley to pulley, of 3,290 ft. The company declares that conventional 42-oz cotton fabric would require four separate conveyors to accomplish the same thing.



Portable Pipe Cutter

A trailer mounted pipe and solids cutting machine named the No. 20 Beaver Cartrailer "Speed-Cut" is being marketed by Beaver Pipe Tools, Inc., Warren, Ohio. The unit can be driven by its own gasoline engine or by a motor. Beaver points out that the unit's particular advantage is its maneuverability. Like the company's standard No. 20 machine, the new "Speed Cut" will cut up to 6-in pipes and shapes, solids up to 2½ in. Wheel speed is 2400 rpm; the arbor is 1 in. The company furnishes the unit with

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GIVES YOU
LOWEST COST PER TON
PLUS FIRE RESISTANT* PROTECTION

FIRE RESISTANT*
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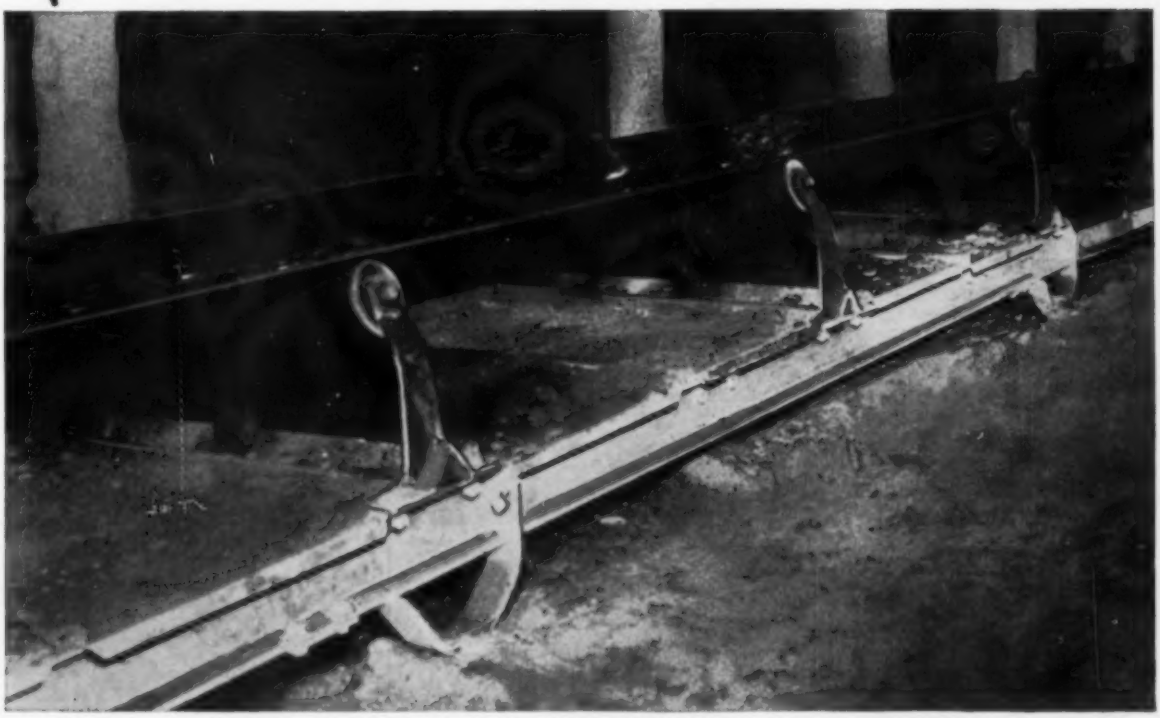

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VICTAULIC COUPLINGS
Simple, fast, reliable. *Styles 77, 77-D,* for standard uses with steel or spiral pipe, — *Style 75* for light duty. Other styles for cast iron, plastic and other pipes. Sizes ¾" to 60".

ROUST-A-BOUT COUPLINGS
For plain or beveled end pipe *Style 99.* Simple, quick, and strong. Best engineered and most useful plain end coupling made — takes a real "bull-dog" grip on the pipe. Sizes 2" to 8".

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The new, boltless, speed coupling, *Style 78.* Hinged into one assembly for fast piping hook-up or disassembly. Hand locks for savings in time and money. Ideal for portable lines. Sizes 1" to 8".

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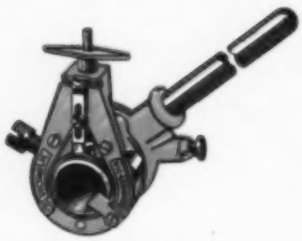
Elbows, Tees, Reducers, Laterals, a *complete line*—fit all Victaulic Couplings. Easily installed — top efficiency. Sizes ¾" to 12".



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Equipment News *(Continued)*

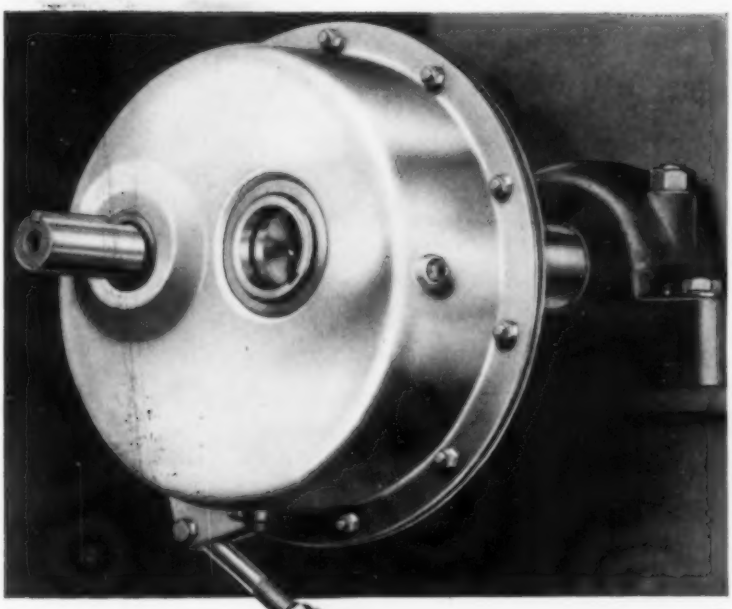
an 8.3 hp Wisconsin gasoline engine with battery and starter, or with a 5-, 7½- or 10-hp 220/440-v, 3-phase, 60-cycle motor.

Air-Borne Dust Protection

Mine Safety Appliances Co., 201 N. Braddock Ave., Pittsburgh 8, Pa., says its new "Dustfoe Ultra-Filter Respirator" will protect men against minute dust particles including radioactive dust and air-borne organisms. The unit weighs in at 6 oz, including the headband, and uses Type H Ultra-Filter cartridge, a cartridge capable of removing toxic aerosols, smoke, fine dusts, bacteria and some viruses. An aluminum facepiece can be worked by the fingers to fit the contour of any face and a neoprene sponge facepiece cushion does the sealing. MSA says filter cartridges can be quickly changed.

Air-Leg Drill Bits

A line of tapered socket, carbide insert type rock bits are being manufactured for use with light air-leg drills by the Timken Roller Bearing Co., Canton, Ohio. The bit, according to Timken, has these advantages: (1) removal from a drill steel and discard without discarding the steel, (2) four-point cross bit for greater footage between sharpenings, (3) new carbides in the cutting edges that are more wear resistant, and (4) a five front hole design plus a deeper and wider clearance between bit wings for faster chip removal. *(Continued)*



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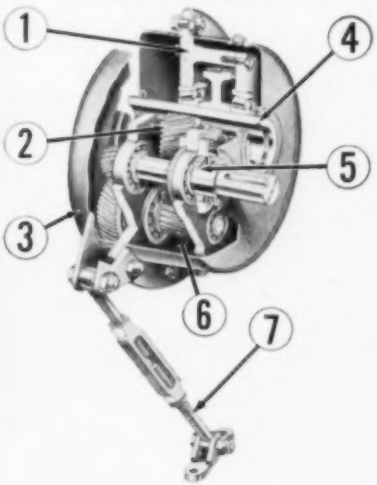
simple-compact-rugged-efficient

Created specifically for the vast number of applications demanding a sturdy and compact speed-reducing unit for direct mounting on the driven shaft, the new Falk all-steel Shaft Mounted Drive is built to give long service life at substantial savings of space, time, power and maintenance costs!

This efficient helical-gear drive, latest in the unmatched list of Falk precision-gearing achievements is an ingenious modification of the time-tested Falk Motoreducer design which has held, for more than 20 years, recognized leadership in this branch of highest-quality power transmission . . . It complements and completes the world-famous Falk line of reduction units covering the entire range of industrial applications.

Investigate the Falk all-steel Shaft Mounted Drive. Write to Department 247 for engineering bulletin, including selection and dimension details.

These famous FALK "In-built" factors *mean long life and dependability...*



1 **All-steel Frame,** with more than double the rigidity of iron, supports all rotating elements.

2 **Precision Helical Gears,** designed and machined by Falk, rated to AGMA standards.

3 **Pressed Steel Housings,** whose sole function is to keep oil in, dirt out; easily removed for gear inspection without dismounting unit.

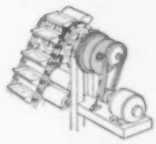
4 **Through Hollow Shaft** with counter bore provides for easiest installation or removal from driven machine shaft extensions.

5 **Backstop** can be furnished with the unit or added later for positive prevention of reverse rotation.

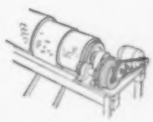
6 **Positive Lubrication,** continuous direct dip of revolving elements at all speeds.

7 **Tie Rod** and turnbuckle serve as anchor and facilitate V-belt or chain adjustment.

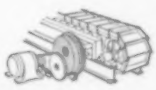
A FEW TYPICAL APPLICATIONS



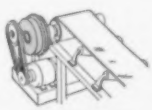
BUCKET ELEVATOR



SAND CLASSIFIER



APRON FEEDER



BELT CONVEYOR

THE FALK CORPORATION, Milwaukee 8, Wisconsin

MANUFACTURERS OF

- Motoreducers
- Speed Reducers
- Flexible Couplings
- Shaft Mounted Drives
- High Speed Drives
- Special Gear Drives
- Single Helical Gears
- Herringbone Gears
- Marine Drives
- Steel Castings
- Weldments
- Contract Machining

FALK

. . . a good name in industry

Metallurgical Methods Prove Out for Pennsylvania Water & Power Company

Hydroseparation and thickening — proven metallurgical processing steps — are being put to work in the coal preparation plant of Pennsylvania Water & Power Co. at Safe Harbor, Penn. Feed to the washing plant is anthracite bearing silt dredged from the Susquehanna River, and the finished product is used as fuel for a nearby power plant operated by the same company.

Here's how Dorr-Oliver equipment fits into the flowsheet:

FIRST — Raw coal bearing silt from the river bed is pumped to a 65′ dia. Dorr Type BW Hydroseparator. Feed rate is 7400 gpm at 10% solids which the BW deslimes at 200 mesh. Underflow, containing 30-35% solids, goes on to further treatment while the overflow goes on to step two, below.

SECOND — Hydroseparator and flotation thickener overflows are combined and fed to a 150′ dia. Dorr Type SS Thickener at a rate of 8500-9500 GPM. Thickener underflow is impounded, and overflow — 7000 GPM — is returned to the process for re-use.

We'd like to tell you more about how Dorr-Oliver Metallurgical methods are now being used in coal preparation plants. Write for a copy of Bulletin No. 7100 to Dorr-Oliver Inc., Stamford, Conn. No obligation, of course.

DORR-OLIVER
INCORPORATED
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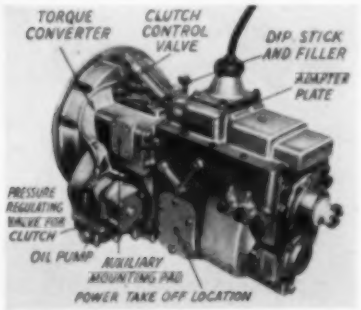
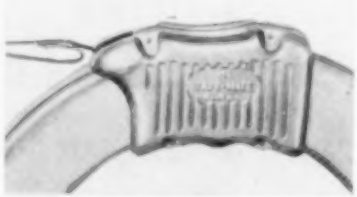
STAMFORD • CONNECTICUT • U.S.A.

Equipment News *(Continued)*



Power Train Package

The "TransVerter," a power train developed by Clark Equipment Co.'s Transmission Div., Jackson, Mich., is easily installed, according to the manufacturer. Engine torque output is rated up to 325 ft lb. The "TransVerter" consists of a torque converter, a hydraulic disconnect clutch and a standard transmission, all united as a single package for mounting with any standard engine. Compact (8 in longer than a conventional transmission and clutch), the "TransVerter" can be installed without major redesigning. Operational advantages are said to include elimination of engine stalling, reduced gear shifting and fine low speed control.



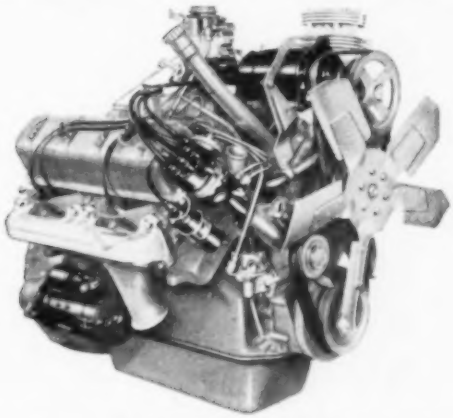
For Wire Pulling

Easier, faster and safer wire pulling plus reduced tape breakage are the advantages of the "Tape Mate" winder, says the manufacturer, Holub Industries, Inc., Sycamore, Ill. The winder fits around a reel as a sleeve would and is assembled with four screws. With no wheels, gears or moving parts to repair or replace, the unit will last as long as the reel, according to Holub Industries. In operation the "Tape Mate" slides around the reel and is pushed forward to wind, pulled back to pay out tape.

Adaptable Wheel Valve

A single-type rim valve, adaptable to any Goodyear tubeless highway rim, has been introduced by the Metal Products Div., Goodyear Tire & Rubber Co., Akron, Ohio. The 2-in unit makes obsolete 16 different valves formerly required. The company says that the valve will decrease cost, downtime and inventory for the smallest truck to the largest earth-moving vehicle. The valve is threaded into the rim wall of a disk wheel or adapted to any size over the road rims

New Heavy-Duty V-8's—206, 226 and 257 hp.



Power to Pull . . . Power to Roll

Off the road or out on the highway, new INTERNATIONAL V-Line trucks get loads moving *fast*, keep them moving. They are powered by new heavy-duty V-8's with the most GO under any truck hood. You get economical operation, top performance. You haul big, profitable loads.

Only INTERNATIONAL short stroke, Y-block V-8's have all these long-lasting, cost-cutting features—"wet" replaceable exhaust valve guides, positive type valve rotators, exhaust valve faces and seats of Stellite, neoprene intake valve shields, sodium filled exhaust valves (V-549). Plus many new lightweight features that reduce costs and increase payloads.

With new V-Line design, there's rugged construction that will take all the off-highway punishment you can give these trucks. There's lots of roomy comfort in the sturdy Comfo-Vision cabs, too. Why not drive one today? See your INTERNATIONAL Dealer or Branch.

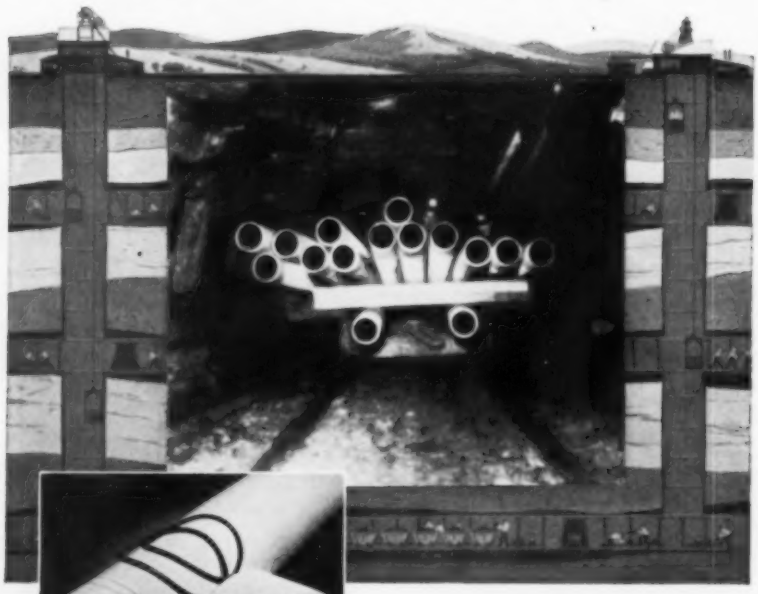
INTERNATIONAL HARVESTER COMPANY • CHICAGO

INTERNATIONAL TRUCKS

All-Truck Built to save you the BIG money!

Motor Trucks • Crawler Tractors • Construction Equipment
McCormick® Farm Equipment and Farmall® Tractors

Time-proven in mine service...



Transite Pipe with the new Ring-Tite Coupling

Cuts installation costs through fast assembly—insures locked-in tightness

MINE OPERATORS have found that Transite® Mine Service Pipe offers many advantages in addition to its long service life. Now with the new Ring-Tite® Coupling, pipe goes together faster, assuring even greater savings in installation.

Proven Corrosion-Resistance

Over a period of many years' service, asbestos-cement Transite Pipe has proved its ability to stand up under the corrosive action of acid mine drainage water. It is light in weight and easily handled. Lines are quickly assembled, even in restricted mine passages. The new Ring-Tite Coupling forms a tight, yet flexible joint that permits deflections of up to 5° at each coupling.

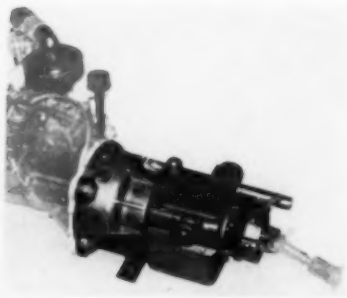
Available for working pressures up to 200 lbs. per square inch and in a full range of diameter from 4 inches up, Transite is also a money-saving pipe for many other mine uses.

For complete information about the new Ring-Tite Coupling and about Transite Mine Service Pipe write for Brochure TR-51A and TR-160A, Johns-Manville, Box 14, New York 16, N. Y.

Johns-Manville
TRANSITE Mine Service Pipe

Equipment News (*Continued*)

by varying the location of the valve hole. In the last instance, two adapters, one for use on 5.25 to 6.00 rims, the other for use on 6.75 to 8.25 rims, are available.



Planetary Transmissions

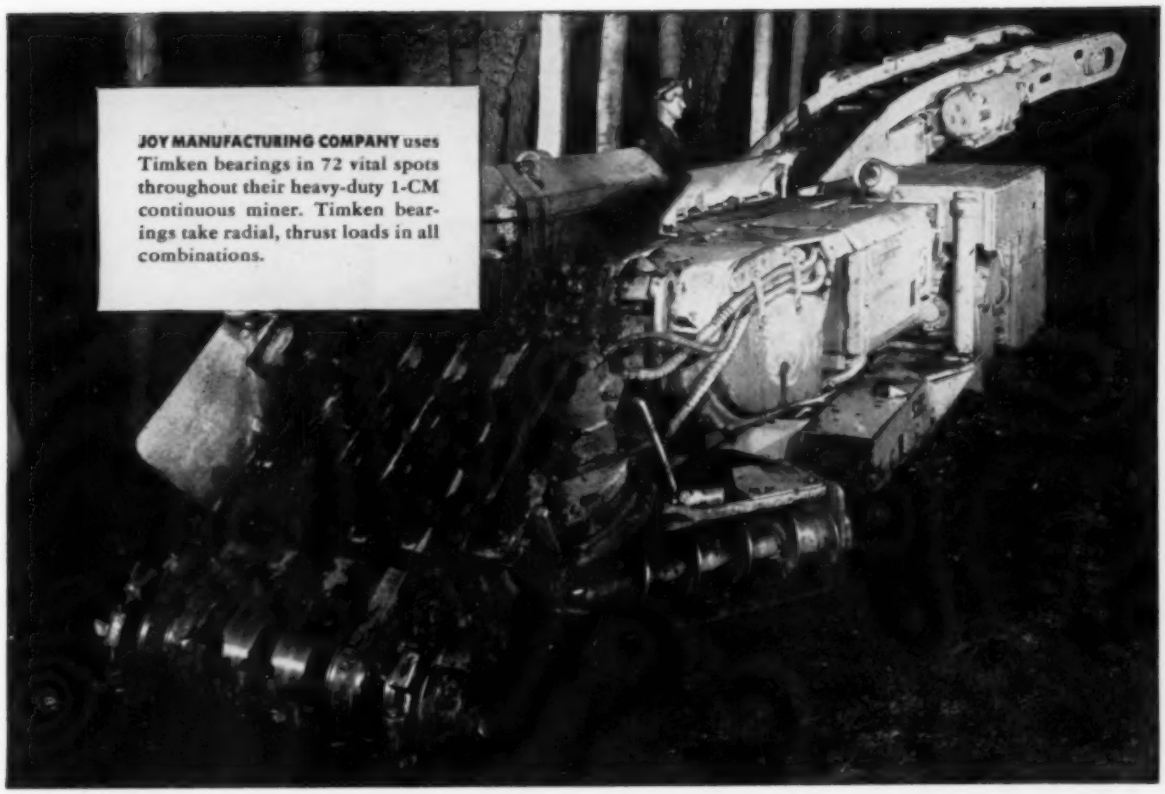
American Gear & Mfg. Co., Lemont, Ill., has introduced six new models of its "Plan-Gear Transmission." Transmissions range from 85 to 150 ft lb to 200 ft lb torque output. They are built with one or two forward speeds and a variety of reverse gear ratios. Advantages are said to be simple operation, e.g., a hydraulic control lever changes speeds or direction in 1.5 sec.

Taper-Socket Bits

Brunner & Lay, Inc., 9300 King St., Franklin Park, Ill., has introduced another line of taper socket type Rok-Bits. The bits are available in several sizes, and are supplied with bronze shims. Brunner & Lay says there are no threads to strip, no body distortion from lock-on and the bit is easily removed from a drill rod.

Chemical Resistant Roofing

A thin-coat, porcelain enamel roofing and siding material designed to resist industrial fumes and chemicals has been introduced by the Toledo Porcelain Enamel Products Co., a division of the Bettinger Corp., Waltham, Mass. The name of the material is "Special V-Corr" and it is a modified version of the company's heavy-duty Premium V-Corr. Special V-Corr requires no painting, according to Toledo. Fabricated in a permanent blue-black finish, the material can be cut with a power saw, can be nailed and is expected to be useful as a field fabricated material. Both the Special and the



JOY MANUFACTURING COMPANY uses Timken bearings in 72 vital spots throughout their heavy-duty 1-CM continuous miner. Timken bearings take radial, thrust loads in all combinations.

Coal mine production jumps for joy—when TIMKEN® bearings roll up 17,818 tons in a month

USING Joy Manufacturing Company's 1-CM continuous miner, a West Virginia mine—in a regular month of operation—brought up 17,818 tons of raw coal. This was an average shift production of 457 tons, and an average production *per man-shift* of 53.8 tons . . . a 40% increase over conventional methods. Built for heavy-duty operation and high-tonnage production, the Joy 1-CM keeps rolling up record production with Timken® bearings in *72 vital spots:* idler head, speed reducer clutch, power take-off, crawler assembly, scroll drive, bar gear case, pump drive reducer, etc.

Tapered construction lets Timken bearings take heavy radial and thrust loads in all combinations. Full line contact between rollers and races gives extra load-carrying capacity. Rollers and races are case-carburized, with hard, wear-resistant surfaces over tough, shock-resistant cores—take tremendous shock loads. Timken tapered roller bearings make closures more effective by holding shafts concentric with housings. This means dirt, coal dust, water are kept out while lubricant stays in.

Friction is practically eliminated. Timken bearings are geometrically designed to give true rolling motion, and precision-made to do exactly that in service. We go one giant step beyond all other American bearing makers in quality control—we make our own steel. Design, precision-manufacture, rigid inspection and control of quality from melt shop to finished bearing all mean you get the finest when you specify "TIMKEN" on every bearing!

The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.

TIMKEN TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS ROLL THE LOAD

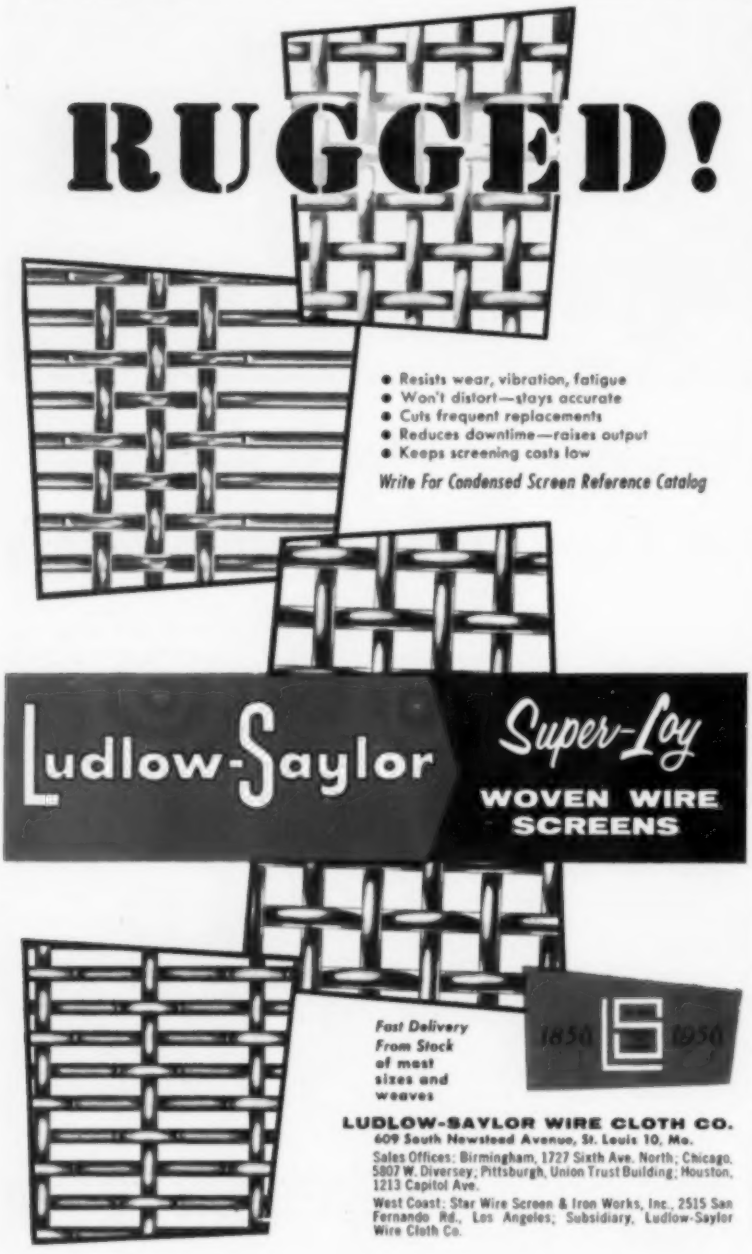
Premium are made of 20-gage steel with a 2½-in corrugation.

Lightweight Air Hoist

An air-powered chain block capable of lifting loads to 900 lb at a speed of 36 fpm, is being manufactured by Atlas Copco Eastern, Inc., Paterson, N. J. Designated the "Air-Motor Hoist MT-504," the unit reportedly is especially suitable for machine shop work. The 55-lb hoist is operated from a ½-in air line with a pressure of 85 psi. The hoist draws 1.6 cu ft of air for each foot of lift. The manufacturer also says that maintenance costs are very low.

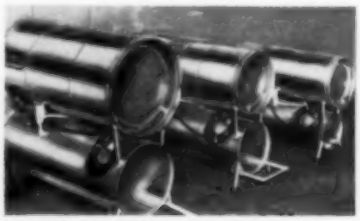
Extreme Pressure Lubricant

A low viscosity, lead-based gear and bearing lubricant named Klingfast 115 has been introduced by the Brooks Oil Co., 934 Ridge Ave., Pittsburgh 12, Pa., for extreme pressure applications. Neither gear pressure nor gear speed will remove a film of the lubricant very easily, the manufacturer maintains. Yet the film—thin, but adhesive—will not retard power transmission. Brooks Oil says the lubricant is a natural lead-based coating and not "an excessive additive" product. The company also maintains that Klingfast 115 will not build viscosity and that it will pump easily at temperatures below freezing.


RUGGED!
• Resists wear, vibration, fatigue
• Won't distort—stays accurate
• Cuts frequent replacements
• Reduces downtime—raises output
• Keeps screening costs low
Write For Condensed Screen Reference Catalog
Ludlow-Saylor
Super-Loy
WOVEN WIRE SCREENS
Fast Delivery From Stock of most sizes and weaves
1850
1950
LUDLOW-SAYLOR WIRE CLOTH CO.
609 South Newstead Avenue, St. Louis 10, Mo.
Sales Offices: Birmingham, 1727 Sixth Ave. North; Chicago, 5807 W. Diversey; Pittsburgh, Union Trust Building; Houston, 1213 Capitol Ave.
West Coast: Star Wire Screen & Iron Works, Inc., 2515 San Fernando Rd., Los Angeles; Subsidiary, Ludlow-Saylor Wire Cloth Co.

Fog Droplet Counter

An electro-mechanical counter makes fast work of the job of measuring and counting fog droplets in the laboratory. Bete Fog Nozzle, Inc., Greenfield, Mass., says that as much as 5,400 drops per hr can be classified and counted with the counter. In operation photographic negatives of the enlarged images of droplets are projected on a special screen with an overall magnification of 400 to 1. The operator places a special caliper on the image of a droplet and actuates the electrical counter. The caliper is equipped with a sliding switch on which a series of contacts have been machined to indicate the size of the opening between the caliper points. Readings before and after yield the number of drops in each size range.



Portable Heaters

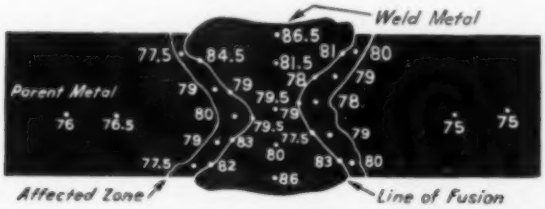
"Economical, low priced," portable heaters named "Silent Glow Recirculating" have been introduced by the Silent Glow Oil Burner Corp., Hartford, Conn. The company says that the line, designated "CUB," will furnish from 120,000 Btu's to 300,000 Btu's of heat depending upon the model. Generally, the company says, former and similar units have been used in exposed areas where permanent heating facilities do not exist, e.g. loading installations, materials handling areas.

Welding Electrode

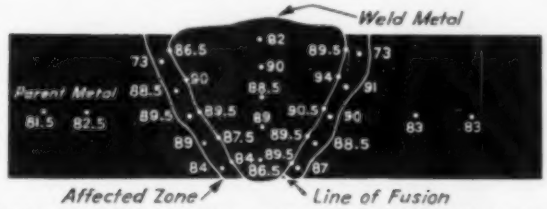
Airco Easyarc 328, a new electrode, has been announced by Air Reduction Sales Co., a division of Air Reduction Co., Inc.,

You can weld this low-alloy, high-strength steel as readily as carbon grades

One of the special advantages of Mayari R is that you can weld it by all the usual methods. The development of this high-strength, low-alloy steel closely followed the development of welding itself, and great care was taken to make Mayari R easy to weld. Its low carbon content of 0.12 max insures maximum weldability.



Rockwell B hardness on ½-in. manual arc-welded plate of Mayari R, stress-relieved at 1050 deg F.



Rockwell B hardness on ¼-in. manual arc-welded Mayari R plate, as welded.

Whether you weld Mayari R by the electric-resistance, automatic-submerged-arc, electric-arc, or gas-welding process, you can use the same general procedures as you would with ordinary structural steel. No need for special equipment, and good welding speeds can be maintained.

Classed as a non-air-hardening steel, Mayari R shows no appreciable hardening from usual welding temperatures. For the general run of welding operations, no preheat or postheat is required. As with ordinary carbon steels, assemblies or structures subject to fatigue, dynamic stresses or severe impact should be stress-relieved after welding.

If you have some special questions on the welding of Mayari R, let us hear from you. And for your files, you should have our Mayari R Catalogue 353. Phone or write the nearest Bethlehem office for a copy.

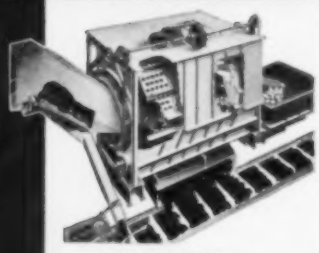
BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

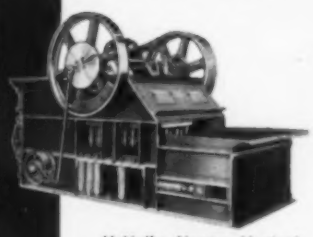
Mayari R...High-Strength, Corrosion-Resisting Steel

America's most complete line of CRUSHING EQUIPMENT



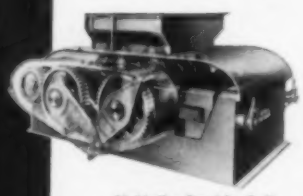
McNally Pittsburg Rotary Breaker

This unit allows positive control of top size in handling run-of-mine washery feed. Production of fines is held to a minimum.



McNally Norton Vertical Pick Breaker

50% Less fines when reducing lump to egg and stove sizes.

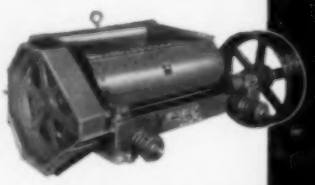


McNally Double Roll Gearmatic ROM Breaker

Built in tonnage ranges from 750 tph to 1400 tph. Full floating gearmatic drive.

McNally Gearmatic Stoker Coal Crusher

This unit offers three prime advantages: high volume production, plus accurate sizing, plus low percentage of fines.



McNally Single Roll Crusher

Universal application 20", 24" and 36" diameter rolls.

AVAILABLE

From Stock and on Short Delivery

For immediate action on complete information write, wire, or call.

McNALLY PITTSBURG MFG. CORP.

Pittsburg, Kansas Wellston, Ohio

Equipment News *(Continued)*

50 E. 42nd St., New York 17, N. Y. The electrode is a low-hydrogen type with iron powder added to the coating. The company recommends it for welding hardenable steels, old rolled steels, low alloy or mild steel when stress relief is needed and when weldments are to be vitreous enameled after welding.

Equipment Shorts

MILL BEARINGS—Link Belt Co., Prudential Plaza, Chicago 1, Ill., has expanded its mill bearings line to include bearings for shafts up to 11-in diameters. The line now includes bearings from $2\frac{7}{16}$ in to 11 in. Buyers can choose among three seal arrangements: (1) steel labyrinth seals for oil or grease, (2) felt and synthetic rubber contact type for grease only, (3) double seals on sizes with $7\frac{1}{2}$ in bore or larger.

FLOOR COATING—"Colorflex Plus AWA," a protective floor coating, resists alkalis, acids, water, oils, grease and gasoline, according to the manufacturer, The Flexrock Co., 3601-I Filbert St., Philadelphia 1, Pa. A penetrating, synthetic resin base solves the problem of painting concrete, Flexrock says.

INDUSTRIAL GLOVES—Leather with exceptional wearing qualities, according to the Wearhide Glove Co., Rockford, Mich., has been used to manufacture industrial gloves that reportedly last three times as long as similar leather gloves. A special tanning process is said to retain the high resistance to abrasion found in natural shell cordovan from which the glove leather is split.

POWER TAKE-OFFS—The SP-321, an addition to the SP line of heavy-duty friction power take-offs, has been announced by the Twin Disc Clutch Co., Racine, Wis. The new unit can handle up to 6,730 ft lb of torque, transmit up to 602 hp at 1,550 rpm. Twin Disc is producing it with a Standard Caps SAE fly wheel housing adapter.

JAW CRUSHERS—Overhead eccentric type jaw crushers with force feed action and long jaw design are available from the McLanahan & Stone Corp., Hollidaysburg, Pa. The units are produced in 13 sizes (10x16 in to 40x48 in) in capacities to 750 tph.

LUBRICANT—Electrofilm, Inc., P. O. Box 106, North Hollywood, Calif., has introduced "Lubri-Bond A," a solid film lubricant said to operate in temperatures from −300 deg to 500 deg. Labeled "air-dry solid film" lubricant, "Lubri-Bond A" dries in 30 min and can be used in conjunction with oil where oil is necessary as a cooling agent. The company is distributing the lubricant in pressure-filled metal containers.

ENGINE CONVERSION—Conversion kits for converting Caterpillar D386 and D364 diesels into gas-burning, spark-ignition engines are being manufactured by the Caterpillar Tractor Co., Peoria, Ill. The kits can be installed only on counter-clockwise rotation engines not equipped with turbochargers or Roots blowers. Features: a 10 to 1 compression ratio and a low tension magneto ignition system.

GRIME REMOVER—Pulmosan Safety Equipment Corp., 644 Pacific St., Brooklyn 17, N. Y., has announced the Pulmosan Sanitizer, a cleaner recommended for removing grease and dirt from rubber, metal, glass. The cleaner deodorizes and disinfects, will rinse free in the hardest of waters, according to the company.

Free Bulletins

WELDING EQUIPMENT—"S" line welding helmets and equipment are the subject of Bulletin 0303-4 being distributed by Mine Safety Appliances Co., 201 N. Braddock Ave., Pittsburgh 8, Pa. The bulletin features a combination welding helmet and "Skullgard" and the M-S-A "Nitrometer Mask" for face protection.

DUST COLLECTOR—Research-Cottrell, Inc., Bound Brook, N. J., is distributing Bulletin 100 in which the "Cyclo-trell" multiple tube dust collector is described. The unit's aerodynamic design of inlet vanes is featured.

UNIONS—Features of the bronze-to-bronze seat "Malleable Iron Unions" manufactured by the Dart Union Co., Providence, R. I., are described in a booklet being distributed by the company's sales agent, Fairbanks Co., 393 Lafayette St., New York 3, N. Y.

AIR-CONTROL VALVES—High pressure and low pressure installations of 2-

NEW! Reynolds Aluminum Mine Service Pipe

Faster, lower cost installations for Temporary Pipe Lines

Now lightweight, corrosion-resistant Reynolds Aluminum Mine Pipe brings new labor-savings and much longer service life to coal mines. Using quick couplings, one man can quickly join pipe sections. And aluminum pipe and couplings easily accommodate coal mine working pressures for drain pipe, air intake, and water intake lines.

Lightweight lowers installation time. Aluminum saves up to 90 percent of the weight of heavy steel pipe.

Quick Couplers Available. Several manufacturers supply high-grade coupling devices to meet mine layout requirements.

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For further information about Reynolds Aluminum Mine Service Pipe and availability from nearby distributors, write *Reynolds Metals Company, P.O. Box 1800-NQ, Louisville 1, Kentucky.*

Write for new brochure "Reynolds Aluminum Mine Service Pipe".

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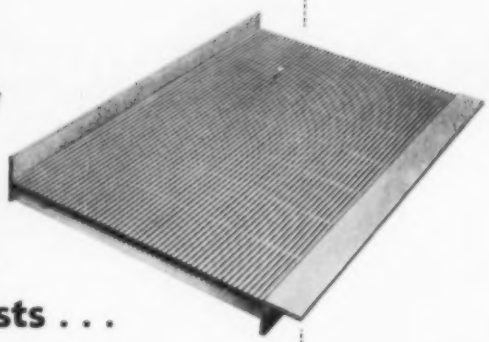

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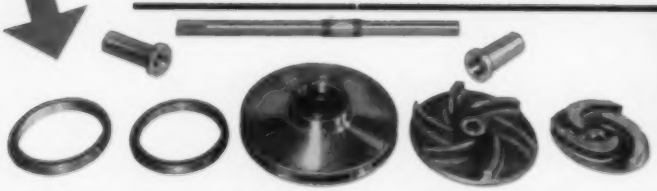

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JOHNSTOWN, PA.

Equipment News *(Continued)*

way, 3-way and 4-way air control valves are illustrated in a 72-p catalog being distributed by Airmatic Valve, Inc., 7317 Associate Ave., Cleveland 9, Ohio. These valves are included: cam, flow control, foot, hand, interlocking, pilot, pressure regulator, quick exhaust, sequence, solenoid, time delay and booster.

HEATING UNITS—Catalog 27-620 containing information about the industrial electrical heating units and devices has been revised by the publisher, Westinghouse Electric Corp., P. O. Box 2099, Pittsburgh 30, Pa. The catalog contains design selection charts on strip heaters, natural and forced convection air heaters, oven heaters, immersion and cartridge heaters, melting pots and heater control equipment.

HEAVY-DUTY PUMPS—Dean Bros. Pumps Inc., 323 W. Tenth St., Indianapolis, Ind., is distributing Circular 146A describing the company's horizontal, forged steel cylinder, steam driven, reciprocating pumps for high pressure services. Diagrams are included.

TORQUE CONVERTER—Twin Disc Clutch Co.'s Series 13,800 3-stage torque converter is the subject of Bulletin 507 being distributed by the company's Hydraulic Div., Rockford, Ill. Construction and application of the converter is shown with text, charts and illustrations.

VIBRATING BAR GRIZZLY—Bulletin 261, distributed by the Nordberg Mfg. Co., Milwaukee 1, Wis., contains information on the Symons vibrating bar grizzly, a high capacity scalping unit for large tonnage operations with feed sizes up to 30 in and larger.

BALL BEARINGS—M-R-C conveyor roll ball bearings are described with text and charts in Bulletin 1529-1 by the Marlin-Rockwell Corp., Jamestown, N. Y. Included are (1) an inboard design to mount directly into a roller and (2) another design for outboard mountings with milled slots in the outer ring which fit in U-shaped brackets in a conveyor frame.

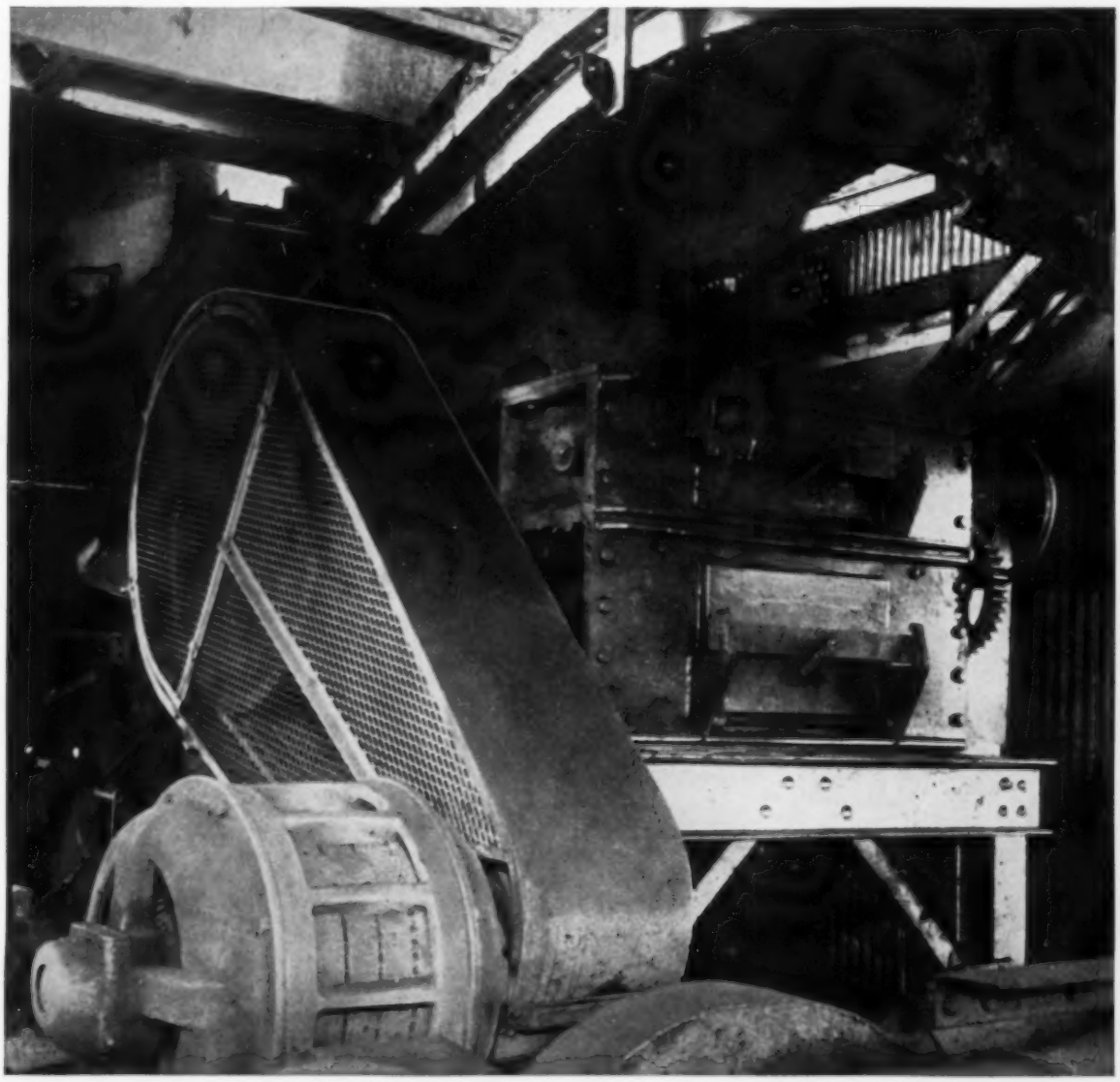
ROOF VENTILATOR—Detroit Blower Co.'s "Silent-Vent" axial roof ventilator is the subject of Bulletin DWA-101. Performance tables explain the operation of the "Silent-Vent" roof exhauster and the principle of its exhaust dissipation. 9867 Pacific Ave., Franklin Park, Ill.

HYDRAULIC HOISTS—The operations of Galion's uni-scopic single cylinder and the duo-scopic twin cylinder front mounted hoists are charted and illustrated in Catalog LL-3059, being distributed by Galion Allsteel Body Co., Galion, Ohio. Also included are pictures of the company's telescopic cylinders and matching roller bearing hydraulic pumps.

VIBRATORY EQUIPMENT—Vibrators, feeders, screens and a number of vibra-

SAVE AND BE SAFE *with Amoco lubrication.*

Amoco mine lubrication is a winning combination of the right products, the right specifications, the right method of application. It safeguards your machinery, simplifies your lubrication problems and saves you money. The cooperation of our mine lubrication specialists is yours for the asking. Just pick up your phone and call your local Amoco office for the facts. *American Oil Company, New York*



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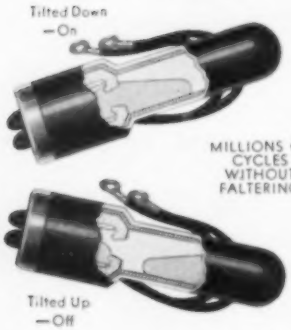

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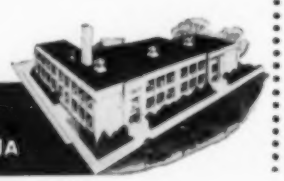

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Equipment News *(Continued)*

tory materials handling machines and tools are the subjects of a 50-p catalog (No. 564) being distributed by Syntron Co., 975 Lexington Ave., Homer City, Pa.

FIRST AID—E. D. Bullard Co., 275 Eighth St., San Francisco 3, Calif., has listed over 100 first aid unit packs and kits in a 6-p catalog.

DIRECTIONAL CONTROL VALVES—Oilgear Co.'s 2-way directional control valves for fluid power systems up to 3,000 psi are featured in Bulletin 80200. Valve body construction and the functions of standard and special plungers are illustrated. 1560 W. Pierce St., Milwaukee 4, Wis.

FLOTATION—Dow Chemical Co. has issued "The 26th Annual Addition to The Flotation Index," a bibliography of articles of special interest to the mining and milling industry, 1955. The index has been compiled from world-wide mining publications and lists articles on flotation research, the chemistry and theory of flotation, flotation reagents and heavy media separation.

DIESELS—Cummins Engine Co., Inc., answers 21 pages of commonly posed questions about diesel engines in a booklet entitled "Diesels." The book is illustrated to acquaint readers with basic principles of diesel operations. Questions and answers are in simple, non-technical terms.

WINCHES—Applications and ratings for truck mounted and stationary winches manufactured by Gar Wood Industries, Inc., Wayne, Mich., are included in an 8-p guide available from the company's Customer Service Dept. Single and double drum winches with capacities of 7,000 to 100,000 lb are illustrated and described.

DUST COLLECTION—The Ventrijet, manufactured by the Pangborn Corp., Hagerstown, Md., for wet collection of industrial ducts is the subject of the company's Bulletin 920. Dimensions, weights and capacities are listed and the Ventrijet's venturi tube principle is described.

HOSE NEEDS—An 8-p booklet being distributed by Hose Accessories Co. contains information on all Le-Hi hose couplings, clamps, nipples, valves and manifolds for tunneling, mining, and general applications. Catalog No. 18, 270 N. 17th St., Philadelphia 32, Pa.

WELDING—Modern Engineering Co., Dept. 91, 3407 Pine Blvd., has updated No. 150 general welding catalog covering oxy-acetylene welding and cutting equipment.

"DO IT YOURSELF" SHELVING—Folder 708, published by the Frick-Gallagher Mfg. Co., Wellston, Ohio, is a 6-p release that describes easily-assembled shelving.

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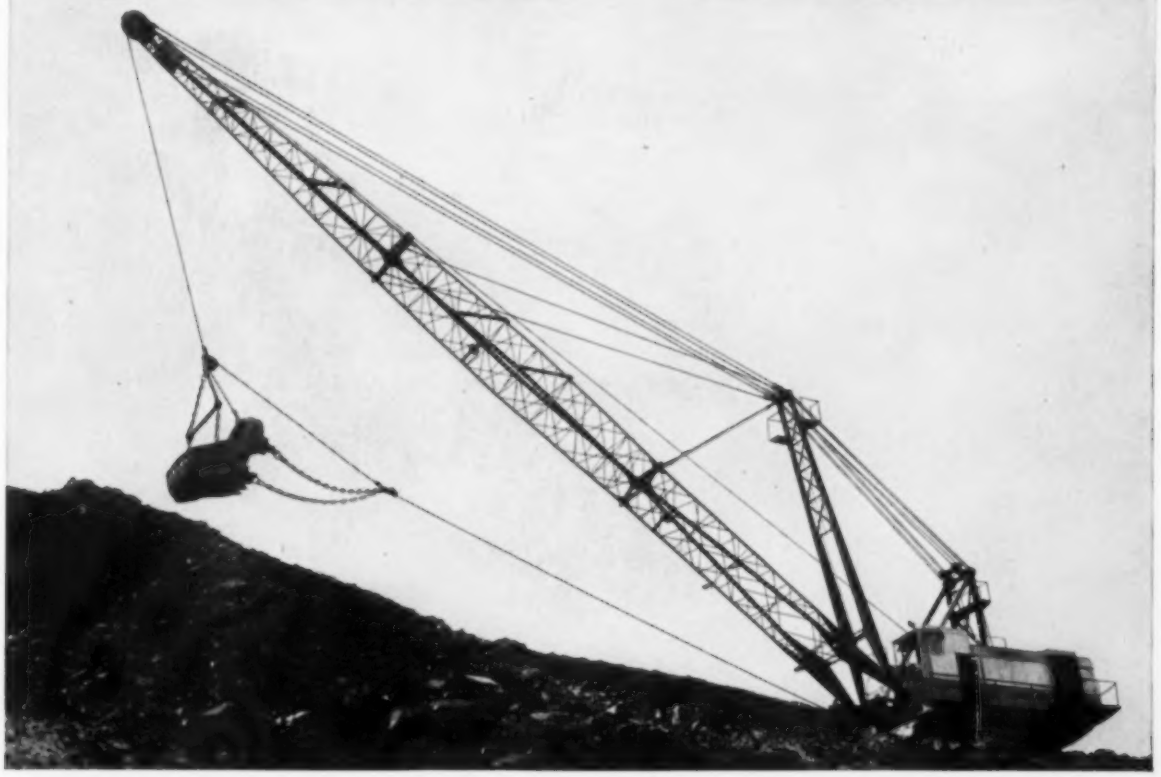

57% Longer Life with New VHS Dragline

Draglines take a real beating in the coal stripping operations of the C B & M Coal Company, Plains, Pennsylvania. Used for removing over-burden, the best Improved Plow Steel draglines lasted 525 hours. When new TRU-LAY VHS draglines were used they established service records of 825 hours—57% better than Improved Plow Steel.

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In addition to longer life, new VHS cuts costly "down time" of equipment for wire rope replacement. This can mean real savings.

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Your American Cable distributor has draglines, slusher ropes and shovel hoist ropes of new VHS in stock now. Just call him and tell him the size and length you want. You don't need any complicated specifications.

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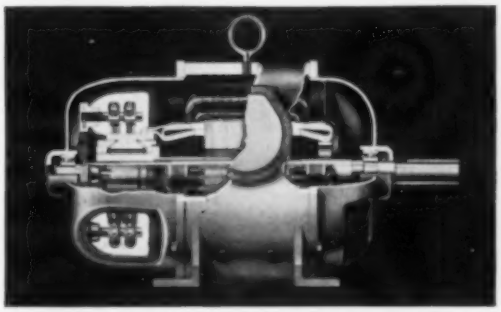
No place for motor failure!

Westinghouse motors assure continuous output of 3 conveyors averaging 600 tons in 16 hours

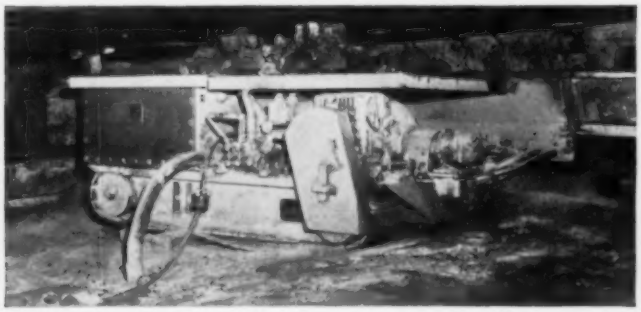
At Omar Mining Company, Westinghouse SK motors drive each of three conveyor units built by The Long Company. Dependable motor operation assures a constant stream of coal.

More than a hundred electric motors, ranging from 5 hp to 150 hp, are used at Omar's No. 15 mine . . . and in most cases they're Westinghouse because of proved performance in getting out the tonnage.

You can bring improved reliability to your operations by getting more facts about the complete line of Westinghouse SK motors, both standard and special. Contact your Westinghouse representative today. J-21967



Each conveyor operates alternately from one area to another; is driven by a Westinghouse 25-hp, 250-volt, d-c motor. Planned movement of coal depends upon reliability of motors subjected to heavy loads and adverse operation conditions.



Dependable Westinghouse SK motors help reduce costly down time because sealed bearings need no lubrication; armature and commutator construction assures maximum electrical stamina; controlled ventilation prevents local heating.

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COVER THE PRESIDENTIAL CAMPAIGN ON CBS TV AND RADIO!

NEWS ROUND-UP

Pitt-Consol, Pocahontas Plan Stock Trade Merger

The coal industry's biggest producer, Pittsburgh Consolidation Coal Co., and the Pocahontas Fuel Co., seventh place holder in national tonnage rankings, last month disclosed plans that would result in the biggest tonnage merger in the history of commercial coal. Pitt Consol, whose stockholders will be asked Nov. 5 to approve an increase in authorized stock, will gain control by exchanging 2⅝ shares of the new stock for one share of Pocahontas Fuel Co. stock. Pitt-Consol already has 9 million shares of authorized common stock, of which 6,497,748 are outstanding.

If the transaction is completed Pocahontas properties will continue under the direction of its present management. A. R. Mathews, president of Pocahontas, will become president of Pittsburgh Consolidation, succeeding George H. Love, who will move up to chairman.

Pocahontas mined 8,069,685 tons last year to record more than a 30% jump over its 1954 tonnage (6,122,078). Pitt Consol led all producers with 28,001,044 tons, an increase of 22.2% over its 1954 tonnage (22,916,792). But, the industry's production leader produces no low-volatile coal from its holdings in the fields of western Pennsylvania, Ohio, northern West Virginia and eastern Kentucky. Pitt-Consol sales in 1955 were $168,600,000. Assets were $230 million.

Pocahontas production is chiefly low-volatile coal. Operating mines in West Virginia, Virginia and Tennessee, the company's sales in 1955 were $95 million. Its assets totaled $70 million.

The merger reflects coal's trend toward fewer, but larger companies. According to the *Keystone Coal Buyers Manual*, an affiliate of *Coal Age*, the number of companies producing more than one million tons declined 21% since 1948. But the number of companies producing less than one million tons declined 34%.

HANNA PIPELINE in final stages of construction. Pipe work was finished late in July and coal is expected to be flowing in "several months." Men and machinery above are Lincoln Electric Co. welding crews and equipment. The Hanna pipeline extends from strip mines south of Cadiz, Ohio, to the Cleveland Electric Illuminating Co.'s Eastlake generating plant near Cleveland. Pulverized coal suspended in water will be pumped at a rate of 3½ mph or 1.3 million tons per year after tests this fall.

Pittston Co. to Merge With Clinchfield Coal

The Pittston Co., which among other subsidiaries, also holds 58% of the stock of the Clinchfield Coal Co., has announced plans to merge with Clinchfield. In a proposal to minority stockholders (42%), Pittston's management has offered a new Pittston cumulative convertible preferred stock at $75 par value paying $3.50 in annual dividends. The trade would be made on a basis of share-for-share. The preferred, Pittston said, would be convertible into 1 1/3 shares of Pittston common at any time over a 25-yr period and will be callable at $80 a share after Dec. 31, 1957.

Last year Pittston placed seventh in national coal production rankings (including Clinchfield, Compass, Lillybrook and Amigo) with 8,058,130 tons. Under the merger Clinchfield will become the Clinchfield Coal Div., Pittston Co. Its officers will continue in their present capacities, and the Pittston board will be enlarged to include Clinchfield's directors.

Clinchfield owns 120,000 acres of coal lands and mineral rights in Virginia, holds other lands under lease in West Virginia, Tennessee and Pennsylvania.

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Shipping To Press Fight In ACS Bid For Libertys

Despite an approval of its application for 30 mothballed Liberty ships by Maritime examiner C. W. Robinson, American Coal Shipping, Inc., found itself in a head-on clash with American ship operators last month. Although ACS had won the first round of what was developing into a slugging match, ship operators were preparing for a knock-down fight before the Maritime Administration board this month. American Tramp Shipowners Association, in fact, was threatening to carry its attack into the courts if it couldn't stop ACS with its arguments before the Maritime board later this month.

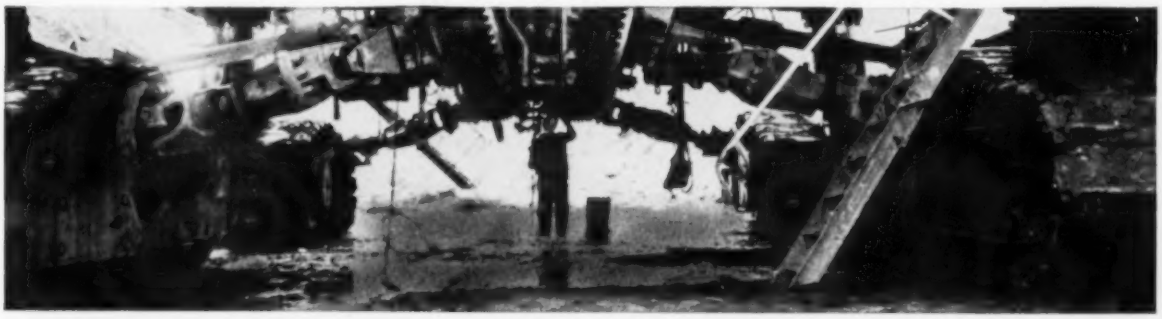
ACS, even with the examiner's approval tucked in its hip pocket, wasn't very happy either. The reason was the approval, which had been laden with obstacles that could be unacceptable to the coal-rails-UMWA triumvirate.

Briefly, examiner Robinson recommended:

In every phase of mining

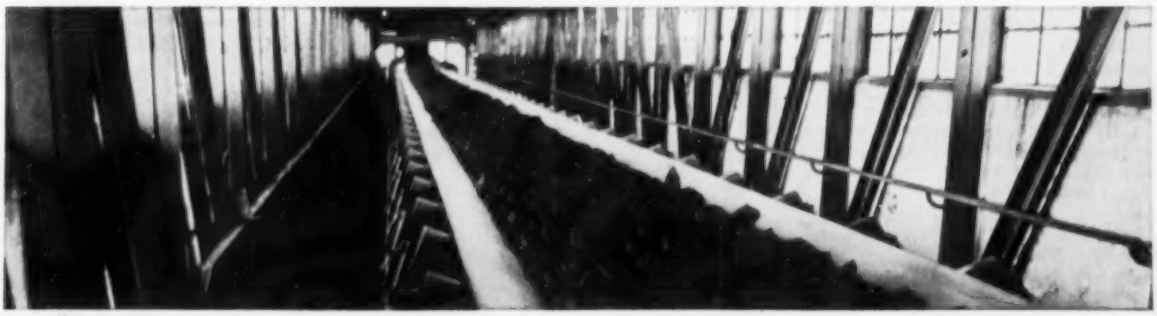
FOR MINE CARS AND ENGINES, Cities Service produces a complete line of highest quality lubricants, specially tailored for rugged, dusty mine operation. Properly applied, these oils and greases can substantially cut haulage costs. . . . Mighty important when you consider these costs now run 20-40% of the total cost of a mine operation! Get the details without obligation from a Cities Service Lubrication Engineer.

Cities Service Lubrication



FOR STRIP EQUIPMENT, nothing surpasses Cities Service Trojan Gear Oils and C-300 Motor Oils. Gears of world's second largest shovel undergo Cities Service treatment. Many strip miners simplify application and inventory with multi-purpose Trojan H Grease. Ideal for bearings, water pumps, all chassis lubrication.

conveys better results!



CITIES SERVICE OFFERS a complete line of lubricants for maximum protection of bearings, belts, trolleys. One major conveyor manufacturer uses only Cities Service lubricants for bearings—scores of miners do the same!

CITIES SERVICE

A complete line of lubricants for every mining need and condition

News Roundup *(Continued)*

- A 1-yr charter in place of the ACS application for an indefinite charter.
- Minimum transport rates fixed by the Maritime Administration to make certain that ACS doesn't operate at a loss.
- Permission to haul only coal, returning empty, unless the federal board okays other commodities. ACS had argued for the right to bring back bulk ore.
- Payment by ACS of the cost of breaking out the Libertys from their mothball berths, although the Maritime Administration is empowered to pay these costs. At $150,000 a ship, ACS's bill for breakout alone would total $4.5 million. To this would be added other costs, e.g. charter fee, $7000 per month per ship; wages, $860 a day.

Plainly, the arguments of ship operators had carried weight.

Ranged against ACS were the American Export Lines, the Bull Lines, the United States Line, the Moore-McCormack Lines, the American Merchant Marine Institute, Luckenbach Steamship Co., Marine Transport Lines, Marine Navigation Co. and U. S. Lines.

ACS points out that American-flag operators, after carrying a mere 5% of overseas coal tonnage last year, are carrying even less this year (1%). ACS suggests, too, that prices are too high (about $9.60 a ton now, or $2 less than the high of $11.60 before ACS was organized).

But ship owners reply that they cannot operate any cheaper and make money. In answer to this year's low overseas tonnage one replies that foreign ships are taking over because they "can operate at around $27,000 cheaper a month than we can, mostly because of lower wages." He "feared" what would happen "if ACS moved in."

Meanwhile, ship owners intend to watch ACS on its wages policy. Before Maritime this month, they are going to ask questions such as "Will the ships be operated under national maritime union wage scales, or will crews be undercut?"

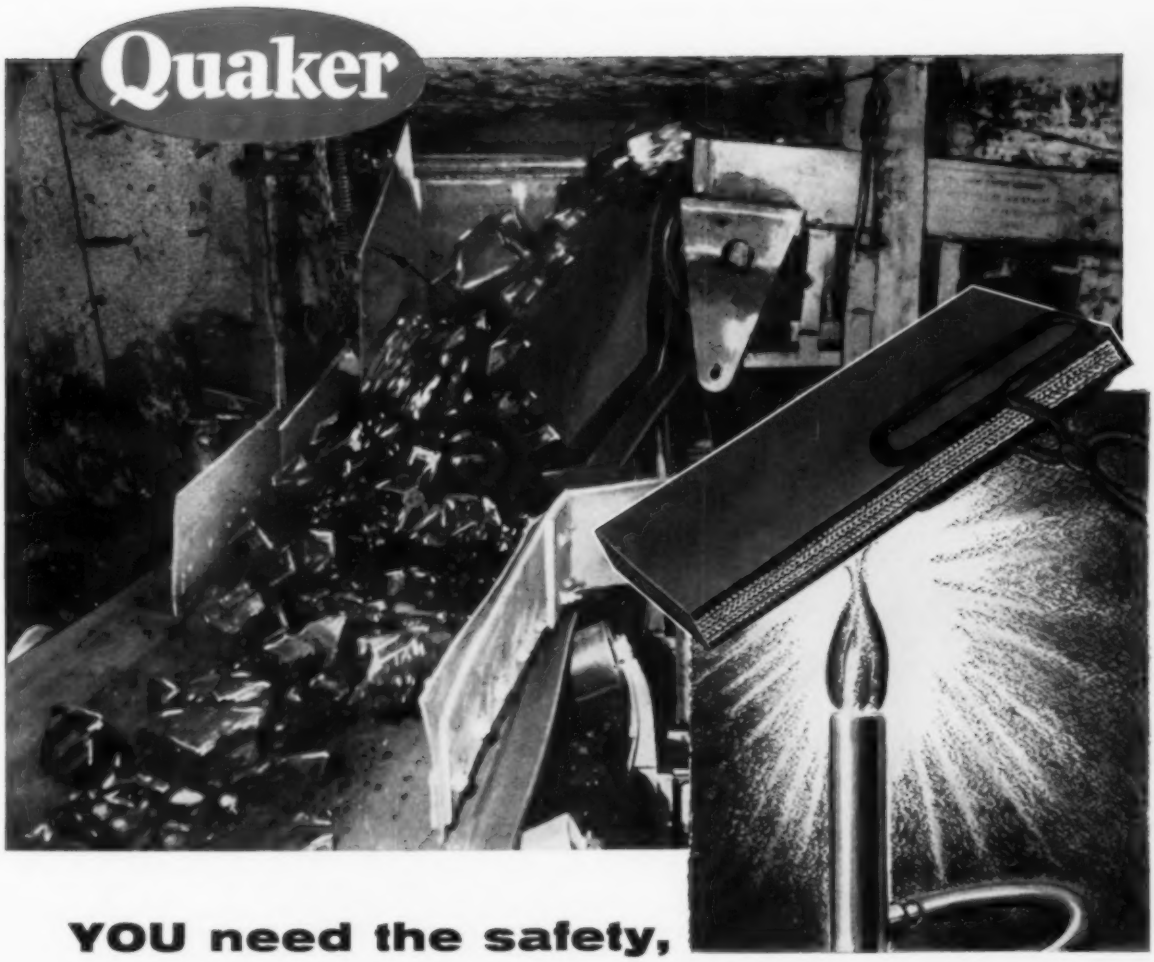
During the hearing before examiner Robinson ACS witnesses testified that the corporation was formed to operate American flag vessels at a profit; that the 30 vessels it wanted would serve as a "stop-gap" until ACS can build its own ships (colliers of 18 to 20,000 tons). ACS also said that it had already purchased one Liberty (the China Trader) for $775,000, a token purchase to meet government charter requirements.

John L. Lewis chided the ship operators, saying they were "afraid of competition." At the same time he warned that if coal mines were forced to cut operations for lack of ship cargo space or because of excessive ocean freight rates the squeeze would be felt far beyond coal mining towns.

Witnesses for ACS also said that coal exports should rise from the present 44 million tons to 100 million annually by 1960. They also said they believed that ACS could ship coal from Hampton

FIRST AID CHAMPIONS—Members of Imperial Coal Co.'s Cardiff mine first aid team and Mine Safety Appliance's V. A. Stanton (holding plaque) after the team won first place during a first aid contest conducted by the Central Pennsylvania Safety Association in Nanty Glo, Pa. Team was rated at 100% by judges who awarded $350 prize, and Mine Safety Appliances plaque. Men above are James Henshaw (left), Herbert Strum, John Pabrazinsky (captain), Joseph Crawford, Mr. Stanton (district manager for MSA), Scott Fuller and Michael Black. Cardiff mine bested some rugged competition. Second place (99.85%) went to No. 2 mine, Berwind White Coal Mining Co.; third (99.653%) was won by No. 73 mine, Bethlehem Mines Corp.; fourth place (99.601%) was won by Maryland Shaft No. 1, Berwind White Coal.

INCOMING, OUTGOING OFFICERS of the Pennsylvania-Anthracite Section, American Institute of Mining, Metallurgical and Petroleum Engineers. Front row, D. S. Lyons (left), chairman, Lehigh Valley Section; W. B. Stephenson, chairman, Philadelphia Section: Thomas R. Weichel, secretary-treasurer, Anthracite Section; E. O. Kirkendall, national secretary, AIME. Second row, W. W. Everett (left), past chairman, Anthracite Section; C. E. Reistle, Jr., national president, AIME; W. Julian Parton, retired chairman, Anthracite Section; David Mitchell, secretary, Coal Div.; Floyd S. Sanders, incoming chairman, Anthracite Section.



YOU need the safety, service and stamina of this fire-resistant, flame-retarding belt

Your Quaker-Quaker Pioneer distributor can supply not only your standard needs—but also your highly specialized ones. You'll find him a prompt dependable money-saving source for everything you need in industrial rubber products. Write for free brochure and name of your nearest distributor.

Carrying the U. S. Bureau of Mines designation "Fire-Resistant U. S. B. M. 28-11" this belt actually exceeds the Bureau's essential standards for underground mine safety. For instance, while the specified flame-test permits burning up to 1 minute, flame is extinguished *instantly* when the test is made on Quaker's belt. Also, after-glow disappears in about one-third the time required by Bureau standards.

In addition to the essential safety, the belt is lightweight and highly flexible with good troughability, yet is tough enough to take shock impacts and stand up to the abrasive wear of heavy, jagged loads. For long service, low maintenance and dependable safety, specify "Fire Resistant U. S. B. M. 28-11" from your Quaker distributor.

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H. K. PORTER COMPANY, INC.

QUAKER RUBBER DIVISION

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H. K. PORTER COMPANY, INC.

News Roundup *(Continued)*

Roads to Antwerp-Rotterdam, for example, at $7.50 per ton and still make a profit.

Speaking for ACS were Richard L. Bowditch,, chairman of the board of C. H. Sprague & Son Co., Sprague Steamship Co.; William C. Brewer, president of ACS; R. E. Salvati, president, Island Creek Coal Co.; A. R. Matthews, president, Pocahontas Fuel Co. and Pocahontas Steamship Co.; Mr. Lewis, president of the United Mine Workers; and M. I. Dunn, vice president, Chesapeake & Ohio Ry.

Confidence among ship owners is dropping. At first they had viewed ACS as a club organized only to drive down charter rates. Now, they're less sure. Coal's argument that it wants to preserve a growing market is an impressionable one, but ship owners only see ACS as an invasion of a business that has only lately become profitable. The lean years in tramp shipping have been gone only a short time. The post-war flood of coal to Europe has been a boon and operators have been cashing in with higher prices to the detriment of coal producers who want a permanent market overseas.

As a result a head on crash looms between the two groups who see their business interests threatened by each other.

MEETINGS

Central Advisory Council, The Mining Electro-Mechanical Maintenance Association; 4th Annual Meeting, Oct. 6, Mountain View Hotel, Greensburg, Pa.

ASME-ASLE Lubrication Conference; Oct. 8-10, Chalfonte-Haddon Hall, Atlantic City, N. J.

Anthracite Conference; Oct. 18-19, College of Mineral Industries, Pennsylvania State University, University Park, Pa.

ASME, Fuels Div., and AIME, Coal Div.; 19th Annual Joint Meeting, Oct. 25-26, Sheraton Park Hotel, Washington, D. C.

Illinois Mining Institute; 64th Annual Meeting, Oct. 26, Hotel Abraham Lincoln, Springfield, Ill.

Central Appalachian Section, AIME, and W. Va. Coal Mining Institute; Nov. 2-3, Greenbrier Hotel, White Sulphur Springs, W. Va.

Kentucky Mining Institute; Annual Meeting, Nov. 8-9, Phoenix Hotel, Lexington, Ky.

Pitt Consol Carbonization Plant to Cost $25 Million

Pittsburgh Consolidation Coal Co. disclosed last month that it will construct coal carbonization facilities for processing and refining near Cresap, W. Va., at a cost of $25 million. The facilities will include a low-temperature carbonization plant capable of processing more than 2.5 million tons of coal annually. A yield of 70 to 75% char and 65 million gal of coal liquids will be produced. The char will be burned at the 450,000-kw, two-unit Kammer power station in nearby Captina, W. Va., which is scheduled to begin operating in 1958. (American Gas & Electric Co.'s subsidiary, Ohio Power, will own Unit No. 2; Olin Mathieson Generating Corp. will own Unit No. 1.)

Although Pitt Consol announced construction of the carbonization facilities the company is acting with American Gas & Electric and with the Olin Mathieson Chemical Corp., latest entry into the expanding aluminum producing industry (*Coal Age*, March, 1956, p 85). The facilities and the carbonization process, themselves, however, are the culmination of Pittsburgh Consol's experiments and pilot plant probes guided by Joseph Pursglove Jr., vice president (*Coal Age*, October, 1952, p 70).

Briefly, the company's carbonization process converts coal by continuously distilling volatiles. Then it follows through with refining the resulting liquids. The process involves crushing coal to minus 10 mesh and then feeding the crushed coal into a large vessel. There, in a fluidized bed, the coal is carbonized at 900 to 950 F at atmospheric pressure. Most of the gases are condensed to form unrefined tars and some fuel gas is produced. The solids make up into a high Btu char. In all, about 30% of the coal is converted to liquids and gases. In a second stage or experimental processing, unrefined tars are upgraded, first by distillation, then by the extraction of compounds with solvents. The resulting products are high order chemicals.

The char turned out makes a good boiler fuel, since it contains little hydrogen and no moisture. In addition to the normal Btu contents of the char, about 2 to 3% of the energy content is sensible heat, which remains after carbonization. With this in mind, Pitt Consol, back in 1952, envisioned the setup of a carbonization plant built next door to boiler plants. The envisioned operation included transporting the char intact with flue gases without substantial loss of sensible heat. For an aluminum plant situated near a coal mine, the setup would again be a natural—cheap power from char, plenty of carbon for electrodes, no freight charges for handling coal and, if within close range of mar-

Preparation Facilities

Hoffman Coal Co., Karthaus, Clearfield County, Pa.—Contract closed with the Daniels Co., Contractors, Inc., for a complete new preparation plant, including a DMS dense media system to wash 4x¼ ROM. Estimated completion, August, 1956.

Valley Camp Coal Co., Elm Grove, W. Va.—Contract closed with the Kanawha Mfg. Co. for a dust collection system, capacity 18,000 cfm. Equipment consists of an Amerclone dust collection unit and hopper, duct work from collection points, a screw conveyor and discharge chutes. Probable completion date, November, 1956.

Knight Ideal Coal Co., Knight mine, Wellington, Utah—Contract closed with the Nelson L. Davis Co. for a heavy media coal cleaning plant. Equipment includes a "Neldco" No. 105 heavy media assembly for washing 5x$^{3}/_{16}$ coal and a "Neldco" thermal heat dryer for drying 1x28 mesh coal. In addition: cleaned coal bins, vibrating feeders, raw coal and cleaned coal sizing screens, crushers and conveyors. Capacity, 150 tph. Completion date, fall 1956.

Freeman Coal Mining Corp., Orient No. 3 mine, Waltonville, Ill.—Contract closed with Nelson L. Davis Co. for a "Neldco" No. 105 heavy media assembly to re-wash 3x$^{3}/_{16}$ jig-washed coal. Assembly capacity, 175 tph. Completion date, fall, 1956.

Sahara Coal Co., Inc., Chicago, Ill.—Contract closed with Nelson L. Davis Co. to augment Sahara's stoker coal rescreening station in Harrisburg, Ill. Equipment includes a gravity discharge elevator, two 6x16-ft triple deck Allis-Chalmers Ripl-Flo screens. Estimated completion, Sept. 1, 1956.

Allison Engineering Co., Foxburg, Pa.—Contract closed with Nelson L. Davis Co. for a bin and four flight conveyors.

Harlan Fuel Co., Yancey Mine, Yancey, Ky.—Contract closed with the Daniels Co. for a complete new preparation plant. Equipment includes a DMS dense media system to wash 8x0 ROM from the Harlan seam. Completion date, mid-September, 1956.

Allison Engineering Co., Monteau Coal Corp., Branchton, Pa.—Contract closed with the Jeffrey Mfg. Co. for one No. 100 unit washery to wash 6x0 coal.

Planning New Equipment or Plant?....

Wilmot Pilot Plant and Coal Laboratory, White Haven, Pa.

Wilmot Pilot Plant Enables You to Solve Feed and Product Problems in Advance

If you are planning on building a new preparation plant or re-equipping your present one, Wilmot's new pilot plant together with Wilmot's engineering facilities enable you to develop your flow sheet and predetermine your operating problems. Here you can see commercial size equipment actually cleaning truck or carload samples of your raw coal, and thus establish the yield, determine the quality of the product, and demonstrate high operating efficiency. Here also is a modern coal laboratory to determine matters relating to coal specifications.

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kets, low freight charges on ingot or finished aluminum.

Back in 1952 this was the planning. Today, in 1956, much of the planning has evolved into action. Aluminum is moving into the Ohio Valley (*Coal Age*, January, 1956, p 108), coal is responding with new mines, and power companies are responding with plans for coal-based power stations. The latest action is Pitt Consol's expansion of carbonization, a process designed to provide cheap fuel and to wring out more dollars from coal with more useful products.

News Briefs

Peabody Coal Co. has ordered three giant shovels, two from the Marion Power Shovel Co., Marion, Ohio, one from Bucyrus-Erie Co., Milwaukee, Wis. The largest, a 70-yd unit being manufactured by Marion, will operate at the New River King mine, Freeburg, Ill., in the Belleville district. The New River King operation is scheduled to begin production (2 million tons per yr) early in 1957. The second Marion shovel, a 60-yd unit, will be used in one of Peabody's southern Indiana strip mines. The third, a 55-yd shovel (Bucyrus-Erie), is scheduled for operation at the River Queen mine on the Green River in western Kentucky's Muhlenberg County. The Bucyrus-Erie machine has a working weight of 2,250 tons, a boom of 145 ft, a bucket arm length of 86 ft, a maximum dumping height of 106 ft, a dumping radius of 147 ft, and a cutting radius of 158 ft. Eleven electric motors will power it. Reportedly, River Queen ordered a 60 cu yd shovel, but changed the order to 55 cu yd to gain a longer reach.

Six of the country's eastern passenger carrying railroads asked the Interstate Commerce Commission last month for fare raises that would, in effect, price them out of the first class passenger market. The Pennsylvania RR and the New York Central were first in reporting that they would seek a large boost, reportedly as much as 50%. Later in the month the two roads, joined by four more, asked for 45%. Two other railroads agreed that a 5% boost in coach rates would be enough for them. The six railroads asking for the 45% increase in first class passenger fares also sought a 5% boost in coach fares. If granted, the 45% raise would be a windfall to airlines already competitive with rails on long trips. (Seeking 45% are the PRR, C&O, NYC, N&W, Pennsylvania-Reading Seashore Lines and the Pittsburgh & Lake Erie. Asking for a coach increase only were the Lehigh Valley and the Reading Railroads.)

Nineteen independent oil producers have filed a petition with the Office of Defense Mobilization calling for immediate federal action to restrict oil imports. The petitioners, acting through Russell B. Brown, counsel of the Independent Petroleum Association of America, based their call for action on the Trade Agreements Extension Act, which, they said, "makes clear that the intent of Congress in providing this mandate for the limitation of importation of defense-vital commodities, as applied to petroleum, was to assure the restriction of imports of crude oil, residual fuel oil, and other petroleum products within the ratio they bore to domestic production of crude oil in the year 1954." As a result of the petition an inter-departmental government committee, as well as the President's Advisory Committee, will be studying the ratio of oil imports. The President's Committee (on Energy Supplies and Resources Policy) is acting on a previous move by ODM director Arthur S. Flemming. Meanwhile, the newest demand to curb imports will await public hearings until interested federal agencies are able to review the petition, collect facts and arrive at conclusions.

Fourth Annual MEMMA Meeting

October 6, 1956
The Mountain View Hotel
Route 30, Greensburg, Pa.

Presiding: R. A. Huth, manager, Mining Div., Universal Welding & Metals, Inc., Pittsburgh, Pa.

General Session: 3:30 p.m.

President's **"Address of Welcome,"** R. S. James, chief, Research & Development Section, U. S. Bureau of Mines.

"Coal 1776 to Now" by D. C. Jones, first president of MEMMA, director of Mining Extension, Pennsylvania State University.

"The Coal Mine of 1976" by J. W. Woomer, consulting mining engineer, Pittsburgh, Pa.

"Atomic Influence on Coal Mining" by J. E. Elkins, manager of mines, Duquesne Light Co.

"Mining Education in the Future" by D. R. Mitchell, chairman of Div. of Mineral Engineering, Pennsylvania State University.

Cocktail Hour: 5 p.m. **Dinner: 6:30 p.m.** **Entertainment: 8 p.m.**

Bituminous Output

YEAR TO DATE	PRODUCTION
Aug. 18, 1956	310,385,000
Aug. 20, 1955	282,657,000

1956 output 9.8% ahead of 1955. A month earlier output was 12.0% above 1955.

WEEK ENDING	PRODUCTION
Aug. 18, 1956	9,960,000
Aug. 20, 1955	9,385,000

Anthracite Output

YEAR TO DATE	PRODUCTION
Aug. 18, 1956	17,066,000
Aug. 20, 1955	16,136,000

1956 output 5.8% ahead of 1955. A month earlier 1956 output was 2.5% ahead of 1955.

WEEK ENDING	PRODUCTION
Aug. 18, 1956	576,000
Aug. 20, 1955	386,000

George's Creek Coal & Land Co., Cumberland, Md., the oldest operating mine in the United States (1837) was bought by the Cherry Hill Coal Corp., Morgantown, W. Va., and Cleveland, Ohio, in a stock purchase transaction. With the purchase Cherry Hill acquires 2,000 acres of coal lands in Maryland's Allegany County and 8,000 acres in Garrett County. Reserves are estimated in excess of 30,000,000 tons. Cherry Hill says it will operate its new holdings as the George's Creek Fuel Co.

Inkerman Coal Mining Co., Jenkins Township, Pa., is recalling 150 miners and laborers in preparation of full scale operation of its No. 6 colliery. Situated approximately 1 mi from Pittston, Pa., the colliery was shuttered more than a year ago, laying off 650 men.

Duquesne Light Co.'s Harwick (Pa.) mine scored 99.83% to win first place in the Allegheny-Kiski Safety and First Aid Association contest August 11 in Springdale, Pa. The Harwick team was led by Louis Bott, captain. Second place at the meet went to the Renton Mine, National Mines Corp. Newfield Mine, Republic Steel Corp., was third.

A modern fine coal cleaning system and a thermal drying unit are being constructed at U. S. Steel's Alpheus central coal preparation plant in the Gary (W. Va.) district. The additions are scheduled to begin operation late in 1957. In a

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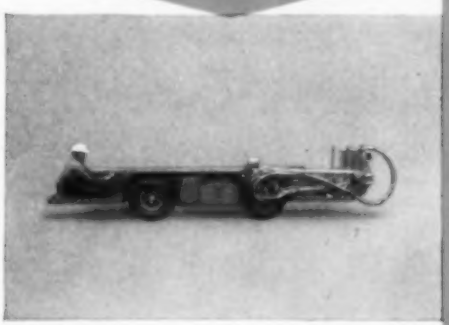
THE ACME JUMBOLTER

Model HSJ



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Time studies have proven that under most mine conditions the ACME JUMBOLTER installs roof bolts 3 times faster than hand held machines.

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The ACME JUMBOLTER takes the heavy lifting and hauling out of roof bolting. Finger tip control positions the stoper at any desired point. Two stopers will cover any point in a space 23' 10" wide without moving the JUMBOLTER. Arms reach 9' in front of the machine and swing 270°. No blocking is required for uneven top. Ample space provided to carry the day's supplies.

The ACME JUMBOLTER was designed to furnish a quick and easy method of drilling Roof Bolt holes where a mine is equipped with stationary or semi-stationary air compressors and having air piped to the working face. The unit is self propelled with full hydraulic drive and hydraulic steering. It is equipped with two stoper jumbo arms and is complete with stopers and dust collectors. Cleveland Model S11, Model S12 or the popular new Model S20 stopers may be used. All equipment is Bureau Of Mines approved. Best operating conditions in seams 36" to 108" high.

We will demonstrate in YOUR mine. For more detailed information write or call —

ACME Machinery Company

WILLIAMSON, WEST VIRGINIA

News Briefs *(Continued)*

new cleaning process fine coal will be removed from R-O-M by wet screen. Then the coal will be pumped from the fine coal sump to desiltors where the slimes or highest clay particles will be removed. The resulting product will move to Deister tables where additional ash will be eliminated. Excess moisture will then be removed mechanically in centrifugal bowl filters. Clean coal from the centrifugal filters will be carried by a system of conveyors to surge bins situated in the thermal drier section. The thermal-dried coal will be oil-treated for density control and, to ease material handling, combined with coarse coal and loaded into rail cars.

An automatic coal-loading and transfer unit equipped with two loading towers that shuttle between the bow and stern of a docked ship has begun operating on the Calumet River near Chicago. Constructed at a cost of $4.5 million by the Rail to Water Transfer Corp. (a corporate entity composed of 29 coal companies in Illinois, Indiana and western Kentucky), the transfer unit eliminates the need to shift vessels during loading. In the past a ship was moved back and forth as much as 40 times for the sake of balanced loading. Now the two mobile towers, fed by a system of automatic belts, do the loading and the necessary moving. The belt system, itself, is fed automatically. On shore, self-unloading rail cars are pushed over an underground hopper where the coal is shaken out automatically five cars at a time. The coal is fed onto a 72-in wide underground collector belt and carried to the transfer point atop a 115-ft tower. From there the coal is fed, via belt, to the mobile loading towers.

Truax-Traer Coal Co. will open two new mines in West Virginia this year. Combined capacity is estimated at 750,000 tons per yr. The mines will replace two that will be worked out in about 2 yr.

Weston Dodson & Co., Inc., Bethlehem, Pa., has formed the Elkhart Coal Co., Clay, W. Va. The new operation has acquired the Leatherwood No. 1 mine, formerly the property of the Osborne Coal Co. Elkhart also has acquired acreage in the Middle Kittanning and No. 5 Block seams in West Virginia's Clay County. The company has already begun a program of development that is expected to push production from 800 to 1,000 tpd.

Pine No. 1 Mine, Pine Township Coal Co., Heilwood, Pa., won first place in the 14th annual first aid contest sponsored by the North Central District Safety Association in Indiana, Pa. Captained by Steve Stupick, Jr., the mine's first aid team scored 99.75 points, won $350 and a Mine Safety Appliances plaque. Second in the contest was the Kent 2A mine, Rochester & Pittsburgh Coal Co., which scored 99.43 points for a $210 cash prize and a United Mine Workers plaque. William W. Thompson led the Kent team. Keystone Mine, Imperial Coal Corp., was third (99.35%), won $175 under Albert T. Barr, its captain.

The nation's railroads are disagreeing on whether to look for another freight rate increase. Eastern roads are reportedly considering a petition for a new boost, but southern rails are against it. In the west, rails are reported saying, in effect, that an accurate appraisal should be made of the effects of the last freight boost, before applying for another one.

1956 Earnings

Truax-Traer Coal Co.—Consolidated net income of $419,729, or $.26 a share on common stock for the quarter ending July 31, compared with a net of $215,441, or $.12 a share, in the same period last year.

Elk Horn Coal Corp.—Net income of $87,702 for 6 mos to June 30, compared with $397,957 for the same period last year. Earnings reflect gains on sale of property amounting to $39,828 in 1956 and $661,130 in 1955.

West Kentucky Coal Co.—Net income of $851,382, or $.99 a share on common stock for the six-month period ending June 30, compared with a net of $190,468, or $.22 a share, for the same period last year. Net income of $364,108, or $.42 a share for the quarter ending June 30, compared with a net of $31,085, or $.03 a share for the same period last year.

Philadelphia & Reading Corp. and subsidiaries—Consolidated net income of $2,120,036, or $1.68 a share on common stock for the quarter ending June 30, compared with a net loss of $1,002,454, or $.75 a share, for the same period last year. Results for the 1955 periods do not include operations of P&R subsidiaries, Union Underwear Co., Inc., and Acme Boot Co. Inc.

Peabody Coal Co.—Net income of $3,040,796, or $.37 a share of common stock for the first half of 1956, compared with $1,888,080, or $.21 a share, in the same period last year.

Island Creek Coal Co. and subsidiaries—Net income of $3,921,698, or $1.83 a share on common stock for the first six months of 1956, compared with a net of $2,206,665, or $1.16 a share for the same period last year.

Glen Alden Corp.—Net income of $758,282, or $.43 a share on common stock, for the three months ending June 30, compared with $690,000, or $.39 a share in the same quarter last year.

Construction was scheduled to begin in August on a $2 million refining works for Jones & Laughlin, Aliquippa, Pa. The refining facilities will use petroleum refining techniques in the production of coal chemicals.

The National Coal Association's "Steam-Electric Plant Fuel Study—1955" has been published by NCA's Department of Coal Economics. The publication contains information on 761 utility steam plants reporting to the Federal Power Commission. Average cost of coal, nationally, according to the publication, was $6.07 a ton, a decrease of 24 cents, or 3.8% less than the 1954 price. The cost of oil increased 1.2%, natural gas cost rose 4%, according to the NCA.

Norfolk & Chesapeake Coal Co. is reopening its Wilson mine (W. Va.) as a completely mechanized operation. Equipped with Joy miners, the mine will produce about 700 tpd, according to John B. Hughey, executive vice president. Its new facilities also include a new tipple and washer. One of the oldest mines in West Virginia, the Wilson operation had been producing steadily since 1904. It was closed late in 1954.

Top first aid honors were won by a team from No. 3 mine, Enoco Collieries Corp., at the Indiana Fifth Annual Safety & First Aid Meet in Terre Haute, Ind. Second place was won by a team from the Sunspot mine, Ayrshire Collieries Corp.

Oregon, long the stronghold of hydro electric power, may be getting coal-based electric power for the first time. Pacific Power & Light Co. is investigating low cost mining possibilities of a 50-million ton field on Eden Ridge in Coos County. If the investigation is favorable the power company will build a 100,000-kw generating plant.

A state-wide program to prevent roof falls, sponsored by the Kentucky Department of Mines and the U. S. Bureau of Mines, has been approved by representatives of Kentucky local coal operator associations, officials of producing companies, state and federal department offices, UMWA districts, the UMWA national office, and the associated safety directors. The program is voluntary and will be initiated at individual operations where safety problems turn up in meetings between management, union, state and federal departments.

Pilot scale tests at the Allis-Chalmers Carrollville Development Laboratory have demonstrated that fly ash can be substituted for shale or clay in the manufacture of portland cement, according to the company's research staff in Milwaukee, Wis. The company believes that utilization of fly ash in cement produc-

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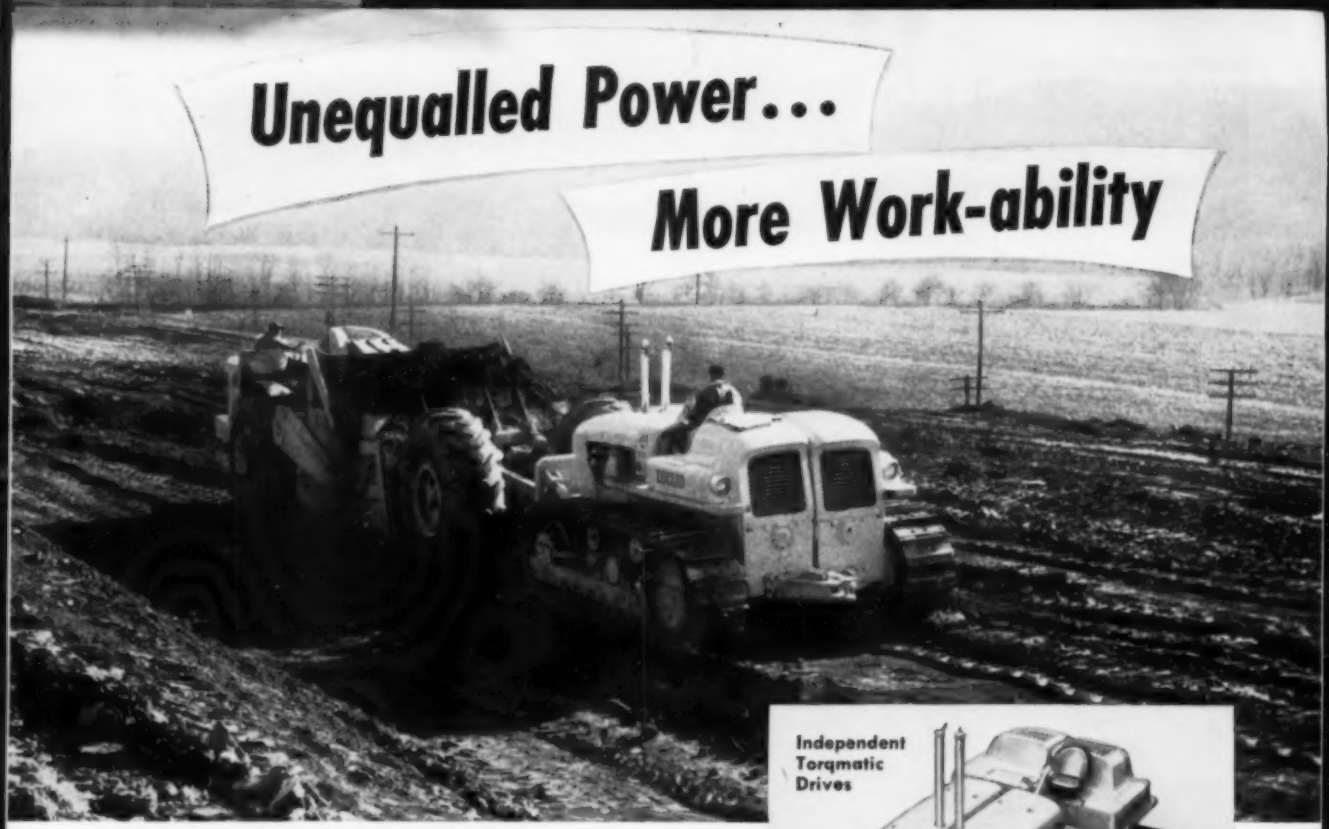

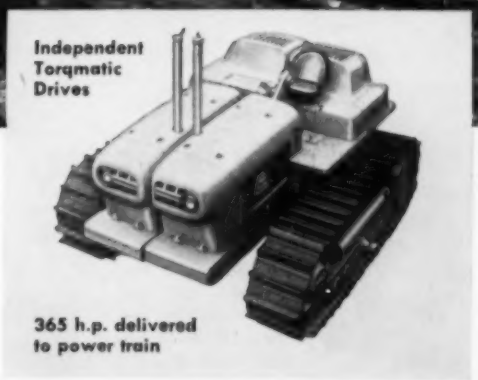

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Powered by two 194 h.p. engines with separate Torqmatic Drives, the TC-12 gives a smooth, steady flow of power to meet every job requirement. There's no master clutch and no manual gear shifting. Three speed ranges in forward and reverse are available by simply moving a selector lever... top travel speed is 8.3 m.p.h. The TC-12 has good stability and traction on rough ground because each half of the tractor is separate and free to oscillate ... the two halves can be easily separated for shipment. Write for detailed specifications.

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Tremendous power, speed and maneuverability make the TC-12 a top performer in heavy duty mine and quarry work. No other tractor matches its production in stripping overburden, clearing, stockpiling, building haul roads, and other big tractor jobs.

For lower cost per ton or yard...
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Schroeder Hydraulic Filter Buggy

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Does away with time-consuming hunting by quickly pinpointing the trouble spot before removing any component from the machine.

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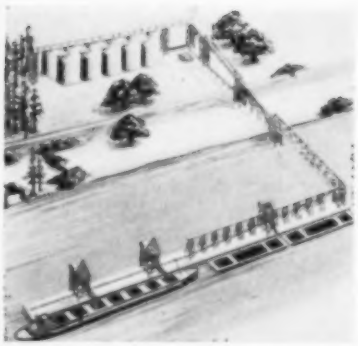
News Briefs *(Continued)*

tion promises an important outlet for large tonnages. At the ACL pilot-cement plant pelletized feed is required. Raw materials, including fly ash, are blended to proper proportions and maintained in pellet form to produce cement clinker. Low dust losses are reported from the finished product.



A $4 million river transfer station designed to transfer coal and phosphate from Mississippi barges to ocean-going barges is being constructed near Port Sulphur, La. Disclosure of the construction was made by Cyrus S. Eaton, board chairman of West Kentucky Coal Co., and Mark E. Eastin, Jr., president of the River & Gulf Transfer Co. During capacity operation the facilities are expected to handle more than 2 million tons of coal and phosphate annually and are a link in developing a new coal frontier on Florida's industrial west coast. Florida-bound coal, at present, moves down the Mississippi on barges where it is transferred to ocean-going barges. As a result a large number of barges must be maintained. Tight schedules are also a must. But, with the transfer station, coal moving from Kentucky mines down the Mississippi will be unloaded and stored in steel tanks. Ocean-going barges arriving from Florida will transfer their cargoes of phosphates to storage tanks, pick up a load of coal and return to Florida without delay. The station's two traveling unloaders (photo) will move coal at a rate of 700 tph using a 6½-ton bucket. Belt conveyors 48-in wide, traveling 600 ft per min, will carry unloaded material over a levee to an over-bin gallery in which a tripper and a 60-in belt conveyor operate. The tripper is designed to transfer material to any of 12 tank-bins 55 ft in diameter and 56 ft high. Extending nearly 450 ft under the two rows of tanks are reclaiming tunnels that house conveyor belts and traveling feeders. A 48-in conveyor in a coal tunnel lies beneath seven tanks and a 36-in phosphate belt is situated under five tanks. Out-loading is accomplished at a rate of 1,200 tph. Traveling on a 60-in conveyor belt for re-loading, the materials will be tripped to either side onto 48-in boom conveyors. Falling free from the end of the conveyors, the material will be loaded into barges through tubular flexible chutes. The wharf, itself, is a creosote timber structure 800 ft long, 38 ft wide. It is protected by a fender system of shock-absorbing rubber sections and barges will be able to tie up on either side. River & Gulf Transfer Co.'s barges will be 436 ft x 50 ft x 22 ft draft.

(Continued)

COAL MEN ON THE JOB . . .

FAMILY PARTNERSHIP—Milford H. Carson (right), president and owner of the Milford H. Carson Coal Co., Woodland, Pa., and son. Ripper behind men is an Ateco mounted on an International TD-24 tractor.

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INCREASE THE LIFE OF YOUR PREPARATION SCREENS 500%

Kleenslot
WEDGE WIRE
PREPARATION SCREENS

Replace wire cloth in the elimination of blinding. Primary screening of raw 5 x 0 and 6 x 0 coal to remove the ¼ x 0 for dry cleaning is no longer a problem at the four West Virginia plants of the Red Jacket Coal Corporation. Kleenslot Wedge Wire Screens have brought about this efficient change over. Since 1951 they have brought about continuous money saving in material and labor for replacements and have relieved plant operators of the need for frequent inspections to detect blinding and holes in the screen cloth.

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It costs nothing to obtain a Wedge Wire recommendation. We will gladly furnish this service without obligation. Remember, Kleenslot Wedge Wire Screens are best by every test, so why not specify the best.

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Gas Street at Nickle Plate R. R.
Wellington, Ohio

News Briefs *(Continued)*

Island Creek Coal's Wyoming Mine won first place in the Fayette-Raleigh-Wyoming First Aid League contest in Beckley, W. Va., last month. Beards Fork Mine, Eastern Gas & Fuel Associates, won second place; the Minden Mine of New River and Pocahontas Consolidated Coal Co. captured third.

Howard W. Inman, Cassandra, Pa., has been awarded the National Coal Association's scholarship in fuel technology established at the College of Mineral Industries, Pennsylvania State University. The scholarship is worth $500.

The New River Coal Co. has been merged with its parent company, the Slab Fork Coal Co., Slab Fork, W. Va. New River, as a corporate entity, has been liquidated.

Charles T. Holland, head of Virginia Polytechnic Institute's Mining Dept., has been named chairman elect of the Coal Div., American Institute of Mining, Metallurgical and Petroleum Engineers.

EQUIPMENT APPROVALS

Two approvals of permissible equipment were issued by the U. S. Bureau of Mines during July.

Joy Mfg. Co.—Type X855-15 24-in bridge conveyor; one motor, 3 hp, 3 phase, 50 cyclyes, 500 v, AC. Approval 2-1159A, July 20.

Joy Mfg. Co.—Type X-707-45 electrical assembly for portable fan; one motor, 3 hp, 3 phase, 60 cycles, 440 v, AC. Approval 2-1160A, July 24.

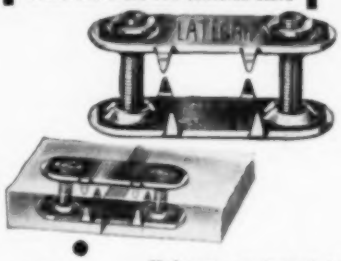
The John Fritz Medal for notable scientific or industrial achievement will be awarded to Adm. Ben Moreell, Pittsburgh, Pa., chairman of the Board of Jones & Laughlin Steel Corp. Presentation will be made October 17 in Pittsburgh during the national convention of the American Society of Civil Engineers. The award represents the choice of four major national engineering organizations (ASCE; American Institute of Mining, Metallurgical and Petroleum Engineers; American Society of Mechanical Engineers; and the American Institute of Electrical Engineers).

In an attempt to secure engineers to man its extended operations, North American Coal has announced the establishment of a college scholarship program for mining and electrical engineering students. Four men have already been selected to begin training this month and will receive $900 a year and tuition. Recipients, says North American, must attend a college approved by the corporation, and, after completing their education, must work for North American 2 yr. This year's quartet of winners, all sons of employees, are: L. J. Price, Barnes-

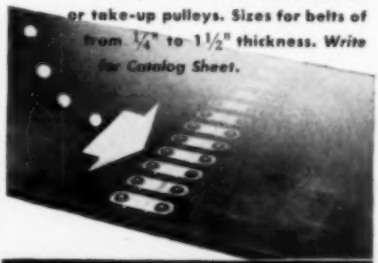
(Continued)

COAL MEN ON THE JOB . . .
TRUAX-TRAER COAL CO., Marfork, W. Va. E. L. Maxwell (left), strip foreman; and Ben Henry, superintendent, take time out from supervisory duties for photograph outside their mountain top mine office.

PLATEGRIP
PLATE FASTENERS FOR CONVEYOR BELTS



Make strong dust-tight, water-tight joints in belts of any width. Special design spreads tension uniformly across belt, allow natural troughing of belt and assures smooth operation over flat, crowned or take-up pulleys. Sizes for belts of from ¼" to 1½" thickness. *Write for Catalog Sheet.*



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Reduce such complaints with Peladow

The customer is always right. And in most cases, his complaint can be multiplied. For many customers choose to remain closemouthed . . . and take their business elsewhere in silence.

Why risk losing customers when it's so easy to end frozen coal complaints with Peladow®, the high-test calcium chloride in buckshot-size pellets.

Spray it! Apply Peladow in a water solution as the coal comes off the boom or loading chute. *Sprinkle it!* Apply Peladow dry at any convenient point prior to loading. *Save with it!* Order Peladow in 100-lb. moistureproof bags, bulk hopper cars, bulk tank cars, or bulk trucks. Its high calcium chloride content (94 to 97% concentration) means four carloads equal five carloads of flake type. Save transportation, storage, and handling costs; apply it manually or mechanically.

In addition, use Peladow to dust-proof coal and keep it clean, reduce dust in mines, firm up roads and haulage ways. Truly, an all-round product that offers advantages for both you and your customers! Get your copy of the Peladow Manual . . . write THE DOW CHEMICAL COMPANY, Chemical Sales Dept. IN 783T, Midland, Michigan.

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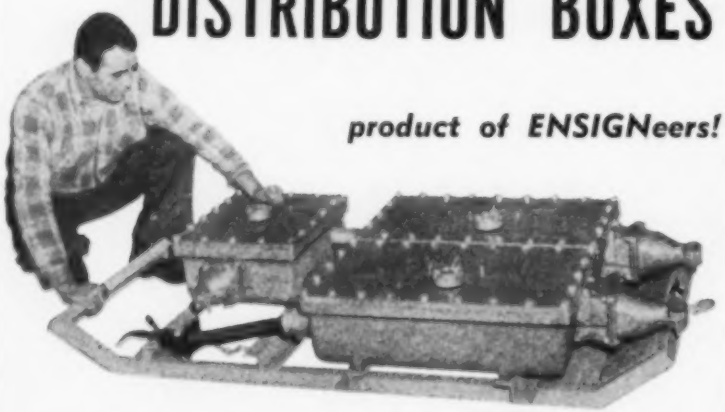
ENSIGN MINE DISTRIBUTION BOXES

product of ENSIGNeers!



Designed for SAFETY

ENSIGN Type KK-G Permissible Distribution Boxes, as illustrated, are recommended for use with mining machine, loading machine and drill.

For many years ENSIGNeers have worked diligently with the mining industry to improve ENSIGN electrical products to the end that these distribution boxes are as safe and trouble-free as can be manufactured.

ENSIGN Distribution Boxes incorporate many exclusive features . . . among them . . .

1. ENSIGN Safety Plugs . . . with all parts renewable
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News Briefs *(Continued)*

ville, Ohio; R. R. Corwin, Powhatan Point, Ohio; J. D. Otto, Powhatan; and J. W. Barton, Bellaire, Ohio.

The Anthracite Institute reports a downward trend in oil burner installations with a report that installations declined 34% in June as compared with the same month in 1955. During the first six months of 1956, the reduction averaged 8% around the country.

The Tennessee Valley Administration awarded coal contracts for 2,138,455 tons of coal valued at $6,203,996. The pacts were divided among coal sales companies in Tennessee (70,000 tons), Illinois (299,292 tons) and Kentucky (1,769,163 tons).

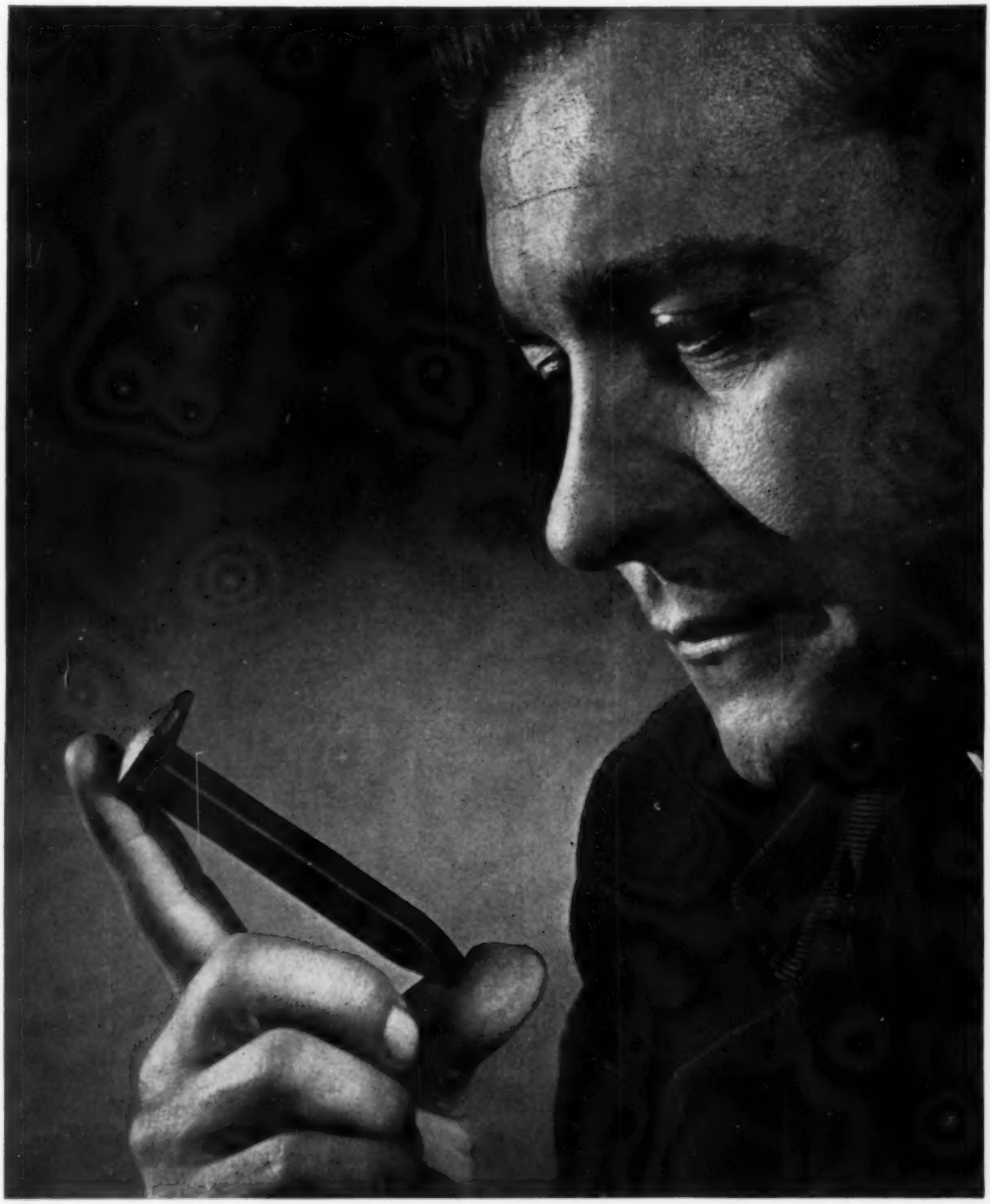
Obituaries

Howard J. Thomas, well-known consulting mining engineer, died in a Birmingham hospital July 31. He was 73. Mr. Thomas began his mining career as a youth, when he was employed in mines at Aldridge, Ala. After a number of years in various subordinate posts he became superintendent of Brookside mine, an operation owned by the Sloss-Sheffield Steel & Iron Co. Later he became general superintendent of mines for Sloss-Sheffield. During World War II, Mr. Thomas was put in charge of coal distribution in Alabama and southern Tennessee as solid fuels administrator for the federal government. Following World War II he joined his brother, **Darius A. Thomas,** in operating mines at Boothton, Ala. His final work in mining was an engagement by the U. S. Army for a survey of the remaining coal deposits in Alabama, southern Tennessee and southeast Kentucky.

John J. Donne, mining engineer for the Glen Alden Corp., died July 15 in Scranton. He was 58. Mr. Donne had held his post as mining engineer for 41 yr.

William H. Holland, 85, an active coal operator from 1893 to 1952, died August 11 in Radford, Va. Mr. Holland was stricken while visiting his son, **Charles T. Holland,** Blacksburg, Va., head of the department of mining engineering, Virginia Polytechnic Institute. The late Mr. Holland at one time operated the Ballanges Coal Co., an operation that began shipping coal in 1893. He later organized the Lookout Southern Coal Co. and operated both the Boone Coal Co. and Lookout company.

Frank D. Shoemaker, 58, president of Penn Anthracite Collieries Co., Scranton, Pa., died July 29. Prominent in the anthracite industry for more than 25 yr, Mr. Shoemaker had been associated with the Philadelphia Reading Coal Co. before joining Penn Anthracite.



"I've always liked Bethlehem Spikes for their strong heads and sharp points. They can take heavy pounding, and they drive fast and true."

Track bolts and machine bolts, too!

BETHLEHEM STEEL

ELIPTEX SCREENS ARE

They Provide Sharp, Accurate Sizing and

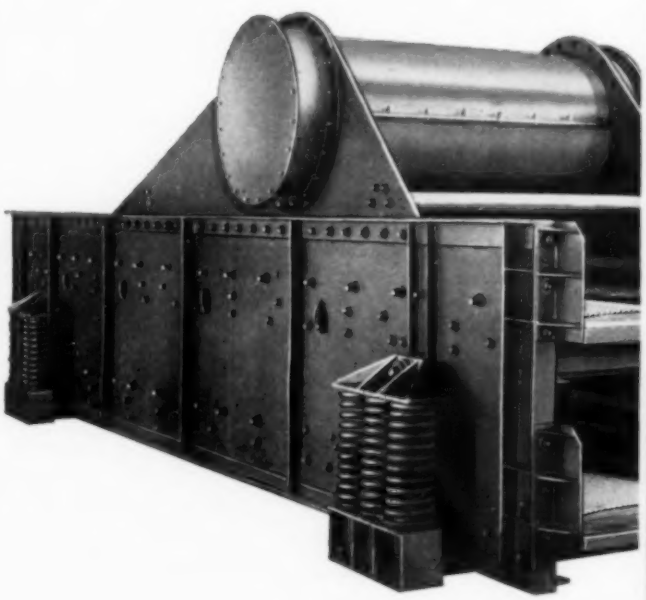
Eliptex Screens are adaptable — to different methods of installation, to a wide range of applications, and to a great variety of materials.

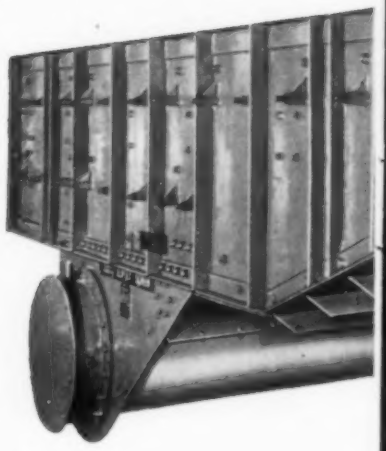
Whether the material you screen is wet or dry, hot or cold, the versatile Hewitt-Robins Eliptex will give you sharp, accurate sizing. With the Eliptex, you can combine washing, sizing and dewatering into *one operation*, not only saving space and time, but increasing efficiency.

A wide range of sizes is available in single, double, or triple decks with a choice of cloth, parallel rod type decking or perforated plate. You can have the Eliptex with the combination of size, deck arrangement and screen surface most suitable for your plant — whether the material handled is coal, coke, ore, chemicals, minerals, aggregates, or any other.

The versatility of Eliptex design permits easy changing of the range of sizes screened, or easy switching from one plant service to another. Any required maintenance can be handled on the job by your own men using the complete instruction book provided with the screen.

With its exclusive three-way motion, the Eliptex gives you the benefit of easier, less expensive maintenance and repair . . . longer life . . . higher safety factors . . . elimination of nonfunctional weight . . . a greater choice of sizes . . . and *sharper sizing with greater accuracy.*





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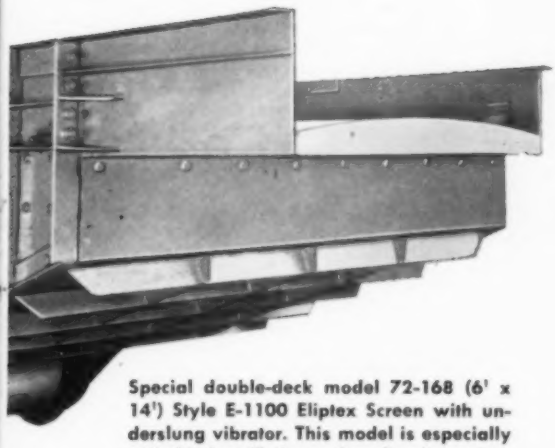
HR HEWITT

STAMFORD,

ADAPTABLE

Effective Dewaterizing

New, simpler, more rugged design of the Eliptex Screen is shown in this photograph of the standard double-deck model 60-240 (5' x 20') Style E-12.



Special double-deck model 72-168 (6' x 14') Style E-1100 Eliptex Screen with underslung vibrator. This model is especially suited to installations where headroom is a problem.

INDUSTRY CASE HISTORY

Headroom Problem Solved by Eliptex Screens

Headroom limitations set up a difficult problem in the installation of Eliptex Screens at the United Pocahontas Coal Company mine in Crumpler, West Virginia. In a normal arrangement, the two screens would not fit into the existing tipple under the shaker screen and feed to the existing equipment.

To overcome this difficulty, Hewitt-Robins revised their standard Eliptex Screens so that the vibrator could be underslung. Thus, Hewitt-Robins engineering was again able to demonstrate the versatility and adaptability of the Eliptex Screen.

The two screens are mounted directly beneath a shaker screen with 1½" openings and operate in tandem to perform a fine screening job before a coal washer. The top deck takes "overs" directly to the washer; the bottom deck acts as a feeder with a long discharge lip, dumping the fines onto a conveyor. At this point, the fines are mixed with washed fine coal and loaded into railroad cars.

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CONNECTICUT

Foreign News

INTENSIVE MECHANIZATION and facts-of-life approach to cutting costs has resulted in more tonnage with less men at the Yallourn Open Cut in the eastern section of Australia's state of Victoria. Here, two Buckau chain dredgers and a Rheinhausen bucket wheel dredger mine coal from three levels.

AUSTRALIA

The brown coal fields of Australia's Latrobe Valley in the State of Victoria are recognized as one of the major potential sources of land-based fuel in the world. Proved reserves of coal for stripping are already in excess of 30 billion long tons and experts estimate that another 30 billion are too deep for economical stripping methods.

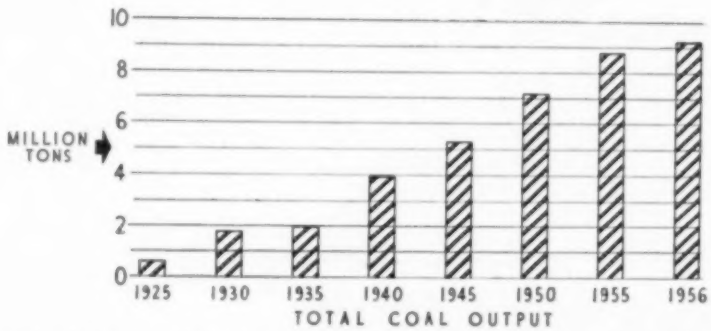
Huge and ever-expanding open cuts are owned and operated by the State Electricity Commission of Victoria, which supplies fuel for a great proportion of the Victoria power system as well as brown coal for processing into briquettes.

Latrobe Valley coal is regarded not merely as a "young" coal but as a young lignite. It is less than 20 million yr old. Finely textured, dark brown and carbonaceous, the coal runs between 50% and 66% in moisture content.

The State Electricity Commission began exploiting the Latrobe fields in 1924 and more than 100 million long tons of coal have been excavated. Coal briquette production is in the vicinity of 600,000 long tons a year and due for large scale increases soon. Gasification of brown coal will come into commercial operation later this year and eventually the major portion of Victoria's town gas will come from brown coal. Meanwhile, metallurgical coke is being produced at pilot plant facilities and planning is under way to produce liquid fuels and by-products.

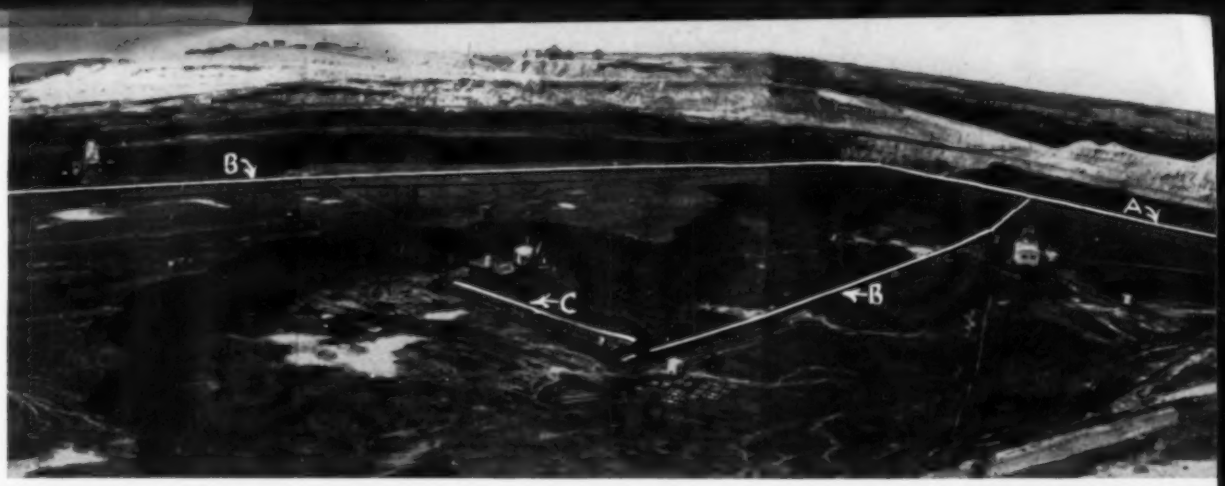
The development of brown coal has meant exceptionally low-cost power for Victoria, but only because of intensive mechanization and a bring-the-cost-down campaign. As a result, production has increased at a fast pace. In 1945 annual output was 5 million long tons. In 1956 it will be almost 10 million; by 1965 the 20 million ton mark will be passed. Currently, proved reserves have less than 100 ft overburden and the present stripping ratio is three long tons of coal for each cubic yard of overburden.

Result of the campaign to lower costs have been spectacular (see graphs, p 138). All-around productivity per man has risen about 50% in the last 4 yr and in some cases an improvement in excess of 100% has been obtained.



RISE IN DEMAND for brown coal from the Latrobe Valley increased until annual tonnage reached more than 9 million. Ever-increasing power needs in Australia's state of Victoria are seen contributing to a doubled coal demand every 7 to 10 yr.

All photographs courtesy of State Electricity Commission, Victoria, Australia. *Coal Age* also acknowledges the assistance of E. D. J. Stewart, assistant engineer for coal production, SEC.



GENERAL VIEW OF Australia's smaller North Open Cut (6,000 tpd) in state of Victoria and layout of conveyor haulage system. A 36-in trunk conveyor (A) travels the eastern boundary of the cut, picks up coal from feeder face conveyors extended on each working level (B). To minimize movement of face conveyors, crawler mounted conveyor (C) and photo below) follow the excavators. Crawler conveyors are constructed in 80-ft sections, can be madeup into 160 and 240-ft. lengths.

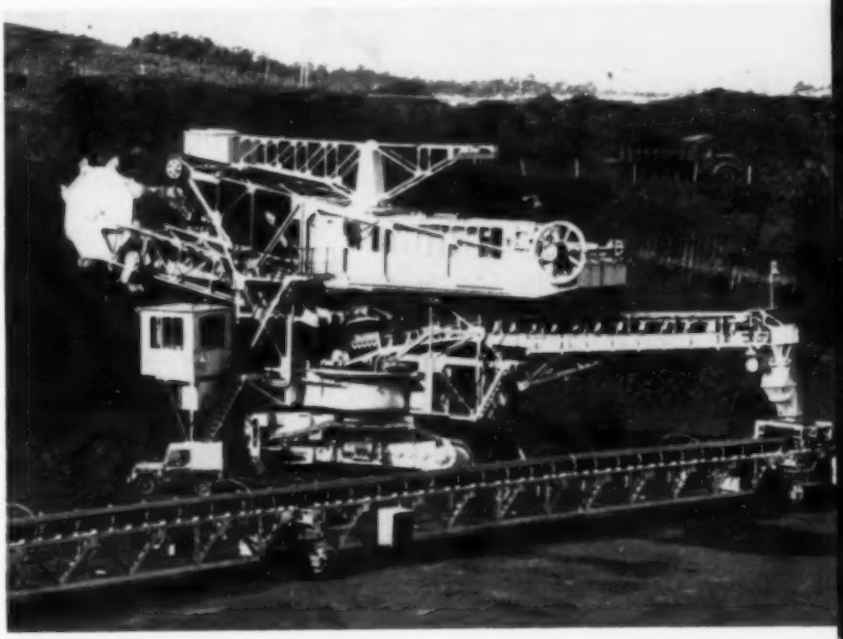
To achieve such results the State Electricity Commission tackled the problems in the following ways:

(1) Procurement of higher-capacity excavating machinery and improvement in transport facilities, partly by using larger rolling stock and partly by major utilization of belt conveyors as a flexible haulage medium. (2) Mechanization of manual labor associated with the maintenance of rail tracks which previously absorbed a large quantity of expensive unskilled labor. (3) Rigid control of labor requisitioning and labor requirements. Closer attention was given to planning, budgeting and budget control. (4) Improvements in maintenance scheduling and in actual maintenance procedures. (5) Improvement of operating practices by greater use of detailed methods investigations.

Excavators

The original machine used for stripping in 1924 was a steam-powered Bucyrus 150B. Today the largest excavator is a bucket wheel dredger manufactured at the Rheinhausen works of Friedrich Krupp, Western Germany. The unit weighs 1,200 long tons and is capable of digging over 1,500 tph. Believed to be the largest coal dredger outside Germany, the unit required 2 yr to construct. It is 250 ft long and its jib reaches as high as a 10-story building. Its nine revolving cutting buckets toss scooped-out coal onto a conveyor belt and its traveling speed is between 15 and 30 ft a minute.

An even larger and more modern excavator (drawing, p 138), said to be the last word in its field, is expected by 1959. Ordered from Buckau Wolf A. G. Western Germany, the machine will be capable of excavating 2,400 long tph, or 30,000 long tpd. Like other units, it will be crawler-mounted and equipped with a 1350-litre (1.75 cu yd) bucket chain dredger.



CRAWLER MOUNTED CONVEYOR made from old trusses. Conveyor is mounted on simple agricultural type crawlers driven by 1 hp motors. Each crawler is capable of 7 deg slew either side of normal position at right angles to trusses. Conveyor, itself, is driven by a motorized pulley. Entire conveyor system, Krupp bucket wheel dredge (300 tph), coal crushing plant and rail wagon loading conveyors are tied in electrically for stopping and starting.

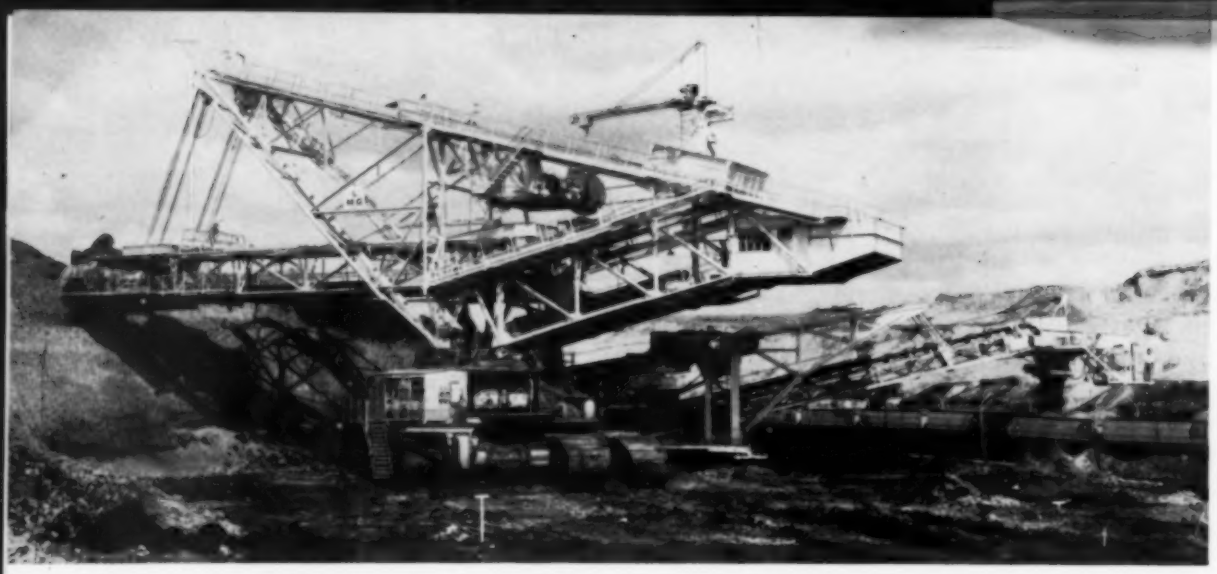
Haulage

Both coal and overburden are hauled mainly by electric railway services in the major Yallourn and Morwell open cuts. The rolling stock has been replaced by larger equipment and train capacities have been raised 200 to 300% in the last 5 yr.

Belt Conveyors

Many of the Commission's engineers believe that the most significant development in haulage has been the growing use of well-planned belt conveyors for haulage from the face.

Initial planning for the use of conveyors in the smaller Yallourn North Open Cut was begun in 1949 at roughly the same time as projects of similar nature at South Agnew Mine in the Mesabi iron range in Minnesota and the Schwandorf



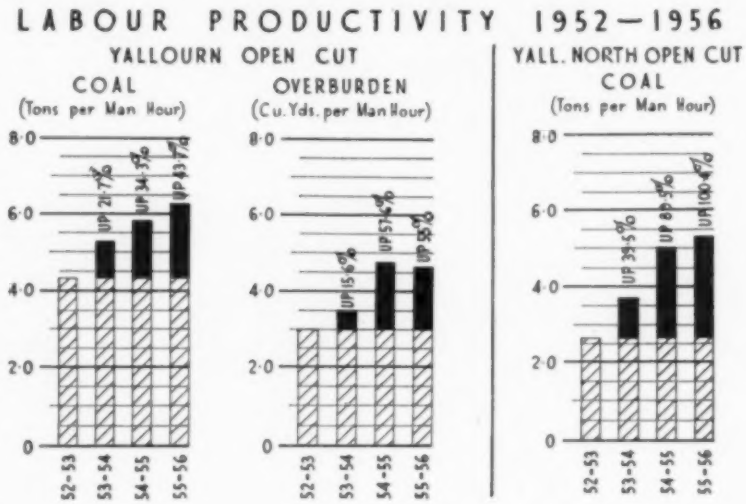
BUCKET WHEEL DREDGER here removes overburden at brown coal strip mine in Morwell, eastern Victoria, Australia. German machine is 70 ft high, weighs 740 tons, can remove 800 cu yd of overburden or strip 800 tons of coal in an hour. Five crawler tracks enable it to move in any direction. State Electricity Commission is preparing to put into service a larger dredger capable of removing 1,100 cu yd of overburden an hour or 625 tons of coal an hour. Still a third that is expected to produce coal at a rate of 1,750 tph is on order from German manufacturer.

Open Cut of Bayerische Brown Coal Mining Co., Germany.

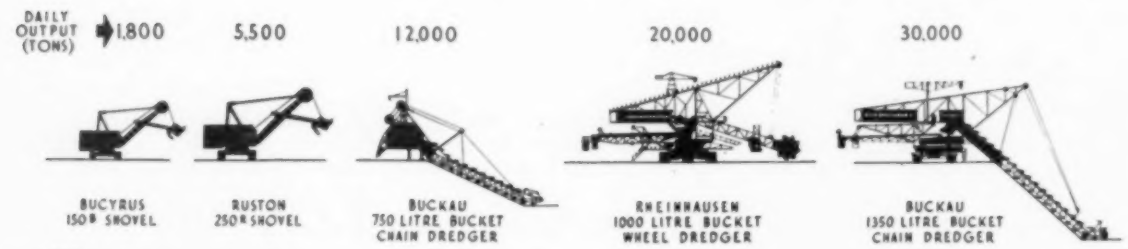
This year, about 90% of the output of the Yallourn North Open Cut, amounting to some 1.4 million long tons, will be hauled solely by conveyor. Overburden operations at this open cut are being switched to conveyor transport next year and overburden transport in the major Yallourn Open Cut (stripping 3.5 million cu yd annually) will be changed over to conveyors within the next 5 yr.

Even more extensive use of conveyors is being envisaged for the Morwell Open Cut, now in the course of development. By 1965, about 10 million long tons or virtually all coal haulage below the top working level will be by conveyors.

The efficient utilization of the conveyor was quickly reflected in coal output figures. Yallourn North is producing double the 1949 coal output with fewer



GRAPHS SHOW increased productivity over the last 4 yr. During this time labor force was cut by nearly 300 men—from 1,350 to 1,070—while production rose 20%. Spectacular gain of 100% recorded at Yallourn North Open Cut, eastern Victoria, was due to replacement of trucks with belt conveyors.



This could be a bottleneck

An intersection of haulageways like this one in a large West Virginia mine *could* mean frequent derailments, coal spillage, constant attention by the maintenance crews.

But, for a very good reason, this particular track layout causes none of those headaches. Instead, it carries heavy traffic smoothly, at normal running speed, with no more than routine maintenance inspection.

The reason? This trackage is Bethlehem-designed, Bethlehem-built, Bethlehem-preassembled. All rail used here is 60-lb rail to assure good performance even under the heavier loads expected tomorrow. All turnouts were tailor-made for this specific spot, and every component painstakingly pre-fitted at Bethlehem's plant to prevent any bugs at the job site.

Yet for Bethlehem, this was not a "special" job. Every mine-track problem gets the full treatment, as you will find when you consult a Bethlehem engineer about your workings. You'll like his cooperative attitude and his intimate knowledge of mining that lets him keep right up with you as you outline what you have in mind.

With the country's energy requirements spiraling upwards, it seems clear that your trackwork will be carrying an even greater burden. Is it really up to the task, in every respect? Now is the time to get the answer, and a Bethlehem engineer is ready to help you find it.

BETHLEHEM STEEL COMPANY
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that bring further automation to **your** coal production

In the coal industry, Simplicity Os-A-Veyor Feeders have proven themselves to increase operating efficiency and lower the costs of maintenance. Simplicity Os-A-Veyor Feeders are self-cleaning units which experience none of the carryback or spillage found in other types of feeders. They are designed to decrease bridging and provide even feeding. The oscillating action is provided by two eccentric shafts coupled to a single V-belt drive, leaving only one assembly and four bearings to lubricate. Os-A-Veyor Feeders can be either main frame supported or bin-hung by springs and cables.

Simplicity Grizzly-Feeders can cut your coal handling costs 50% because they combine two operations . . . scalping and feeding . . . in one machine. Old type feeder plus stationary grizzly are eliminated, thus saving you both plant room and operating and maintenance expense. Available in sizes from 2′ x 8′ to 6′ x 12′, and in capacities up to 1000 tons per hour, the Simplicity Grizzly-Feeder has already improved production for many coal operators, and can do the same for yours. This is a rugged, simply-designed unit that will give you maximum output with very little maintenance.

Write us for full information on both the Simplicity Os-A-Veyor Feeder and the Grizzly-Feeder.

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Foreign News *(Continued)*

men than it had employed in 1949. Transport costs were reduced a full 70% during the first year of operation. Previously, haulage was effected with 10 cu yd diesel trucks, but the soft nature of the coal, combined with a high rainfall, produced extremely poor running conditions over the coal and transport costs were heavy until the introduction of conveyors.

Mechanized Rail Track Work

The older excavating machines, as well as the rail transport, are all rail mounted. For many years shifting rail tracks was carried out by a mechanical track-shifter. It was necessary, then, to use manual labor to jack tracks for leveling, tamping, ballast, fixing and loosening bolts.

Now, tracks are lifted with a Nordberg track jack or a locally designed power-operated jack of a similar nature. Sometimes specially-designed hydraulic jacks are used requiring only one man to operate instead of three for the old ratchet jacks. A Matisa tie tamper, assisted by air picks driven from small mobile compressors, handles track maintenance. Ballast is spread by a newly-designed type of ballast truck and air wrenches handle all bolt work.

The manual part of formations and drainage work has been reduced to a minimum by the extensive use of small excavators, overhead loaders, small ditchers and tournadozers. Manual ditching and drain work have been abolished and large drains are made by an excavator with a back-hoe or a Barber Greene type ditcher. Work considered to be very small is done by an Aveling Barford capable of digging a drain about 1 ft wide.

Manpower Reduced

Management claims that as a result of its extensive modernization and mechanization, manpower requirements have been reduced by about 40%, while output has surged about 20%. The capital expenditures needed to achieve these results was considerable, but not prohibitive. And one has to remember that manpower here, particularly skilled manpower, is extremely difficult and costly to obtain and to keep. For one thing, workers in Australia enjoy more paid holidays than anywhere else in the world.

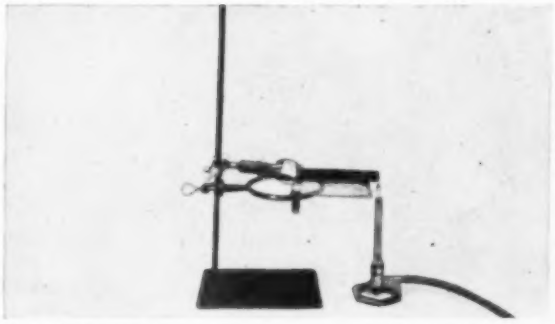
A high percentage of men are in a three-shift, seven-day group. Since work continues every day of the year, penalty wage rates are used with a maximum of double time on Sundays and holidays. Thus control of the strength and distribution of manpower is essential to see that full benefit is derived from the use of expensive mechanized equipment.

Maintenance

Better maintenance scheduling, closer scrutiny of gang sizes, improved job engineering and full utilization of expensive manpower have enabled maintenance labor to be reduced by over 10% with an accompanying increase in ouptut of 20%. The widespread nature of operations (it is about 6 mi around the Yallourn Open

AT U. S. BUREAU OF MINES:

NEOPRENE CONVEYOR BELTS PASS THE TESTS FOR FIRE RESISTANCE!



FLAME TEST determines whether or not belt will spread flame if exposed to a fire. Belt specimen is held in a Bunsen burner flame for one minute in still air. Burner is turned off after one minute, and air is blown across specimen at 300 ft. per minute. Flame from specimen must not last more than one minute; afterglow must not last more than three minutes. Neoprene belts are self-extinguishing well within the permissible limits for flame and afterglow.

FRICTION TEST determines whether or not frictional heat can start a belt fire if belt jams and drive pulley continues to turn. Belt specimen is draped over pulley driven at 110 rpm and one end of specimen is clamped to floor. Weights are added periodically to other end during 2-hr. test until total of 270 lbs. is reached. Thermocouples in belt measure temperature; 300 ft./min. air current is blown across belt. Specimen must not flame, glow or reach temperature above 250°C. Neoprene belts run cooler than other belts and show no signs of flame or glow.

* * * *

NEOPRENE BELTS OFFER MORE THAN FIRE RESISTANCE ALONE

"Fire-resistant USBM" on conveyor belting means that it has been tested for flame resistance and accepted for listing by the U. S. Bureau of Mines. But if it carries this label *and* is made of neoprene, the belting gives you *more* than just flame resistance.

For years, the rubber companies that make your conventional belting have been making neoprene belting for use where service conditions cause ordinary belting to deteriorate. It resists sunlight and weathering, and won't soften if oil or grease get on it. Of course, it resists cutting and abrasion.

No increase in belt tension is needed with neoprene belting, since its coefficient of friction is similar to that of rubber. It runs as smoothly as conventional belting, even in cold weather, and has the proper troughing characteristics for carrying coal.

Next time you order conveyor belting, get more than fire resistance alone—get neoprene!

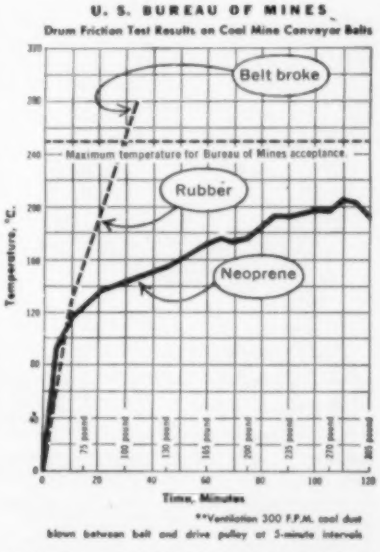
NEOPRENE BELTS DISSIPATE HEAT... The chart at the right shows typical results of drum friction tests on neoprene belts and on the rubber belts ordinarily used for underground conveyors. After a neoprene belt reaches a temperature range of 180°-220°C., its heating curve levels off to a nearly constant value—despite increased friction by the addition of weights.

NEOPRENE

The rubber made by Du Pont since 1932

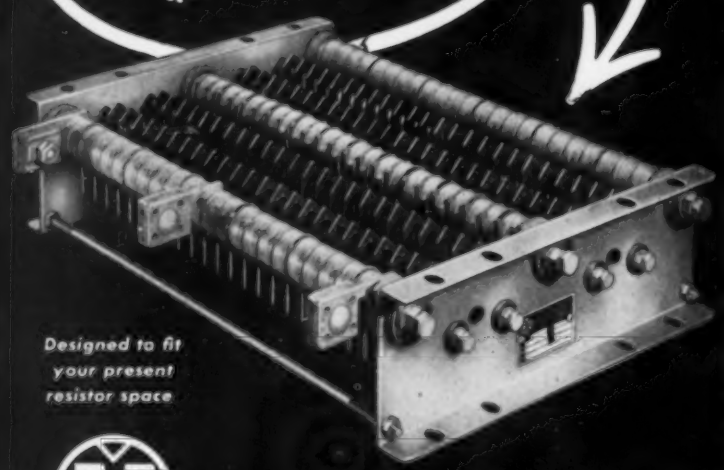
DU PONT

REG. U. S. PAT. OFF.



BETTER THINGS FOR BETTER LIVING...*THROUGH CHEMISTRY*

RUGGED
all the way thru!



Designed to fit your present resistor space

P-G STEEL GRID RESISTORS
consistently prove their value in
MINING SERVICE

- Steel Construction
- Mica Insulation
- Corrosion Resistant
- Vibration Proof
- Moisture Resistant
- Provision for Expansion
- Adequate Ventilation
- Rugged Terminals

By use of those durable raw materials . . . steel and mica, and the P-G exclusive features of design, these steel grid resistors have the "built-in quality" to overcome factors which often cause resistor failures. Vibration, moisture laden or corrosive atmospheres have little effect on continuity of service. Try Post-Glover Resistors for heavy duty applications where resistors are subject to severe service . . . continuous "Trouble-Free" performance is assured.

P-G
The Nonbreakable Steel Grid Resistor

THE POST-GLOVER ELECTRIC COMPANY
• ESTABLISHED 1892 •
221 WEST THIRD STREET, CINCINNATI 2, OHIO

Foreign News *(Continued)*

Cut at grass level and the two open cuts at Yallourn and Yallourn North are three miles apart) made it advisable to provide secondary maintenance facilities close to major operating areas. This results in a reduction of the maintenance gangs' idle time and reduced machine downtime.

In the last few years, maintenance engineering has received some special attention when orders for new equipment have been contemplated. The evaluation of the design of spare parts and materials has been assisted by more extensive and more accurate plant records together with the scrutiny of spare parts usage arising out of scheduled maintenance.

Australians are convinced that increased output and improved productivity are conditional on mechanization and on better methods of work, which in turn depend on highly skilled management and on the cooperation of all employees. On the world's biggest brown coal fields this is as important as it is in the United States or in Europe. The success of the State Electricity Commission of Victoria in its coal mining operations deserves a careful study and appreciation of the factors involved in a big attempt to use big coal resources.

Alicja Grobtuch
McGraw-Hill World News
Melbourne

GERMANY

A patented process that forces dust particles to coagulate into particles of more than 10 microns, thus making them harmless during breathing, has been reported in Germany. In the process a few milligrams of an undisclosed chemical substance is added to air sufficiently to generate an electro-negative potential that causes the particles to coagulate. The chemical is combined with a foaming agent, dissolved in water in a proportion of 1 to 200 and added to air currents as an aerosol. Experiments with animals are planned before the process is tried out in mines.

BELGIUM

The colliery disaster at the small town of Marcinelle has become an international issue because of its size—(262 men are dead) although less than half the bodies have been found and because of the many nationalities involved. Only 13 men reached the surface alive; of the dead and presumed dead, not much more than a third were Belgians, four-fifths of the remainder were Italians and the rest a medley of Ukrainians, Poles, French, Algerians, Greeks, Germans, a Dutchman and a Briton.

Belgium's collieries are mostly old and the seams narrow, faulty and difficult. Coal-raising is costly, and is not yet mechanized on a large scale. For lack of Belgian labor, miners are recruited from far and wide, especially (by Inter-Government Agreement) from Italy. To help get

(Continued on p 146)

OVER 50 YEARS
R AND S COMPANY
SERVICE TO INDUSTRY

now in operation...

2 MORE

Modern Coal Preparation Plants

designed and built by

Roberts and Schaefer Company

MOUNTING sales and production have necessitated repeated additions to the Peerless Coal & Coke Co. plant at Vivian, West Virginia, illustrated above. Designed and built originally with R&S equipment, the first addition at far right incorporated R&S air washing to remove the fine size impurities produced by modern mechanized mining methods. So satisfactory has been this installation that the most recent addition also contains additional air washing facilities.

Similarly, in the modern plant of the Crozer Coal and Land Co., Dott, West Virginia, the new addition, illustrated at lower right, also employs R&S Super-Airflow equipment with equally satisfactory results.

Although both these well-known companies—and many others—have found R&S Super-Airflow cleaning to be the most satisfactory for their conditions, R&S has also designed and installed other washing processes. Your confidence in R&S engineering integrity is justified. Knowledge and experience in designing and erecting these different types of coal preparation plants in all coal producing regions of the country enable our engineers to select for you the method that exactly meets your need and gives the most satisfactory, most economical results.

Roberts and Schaefer Company
Subsidiary of Thompson-Starrett Company, Inc.
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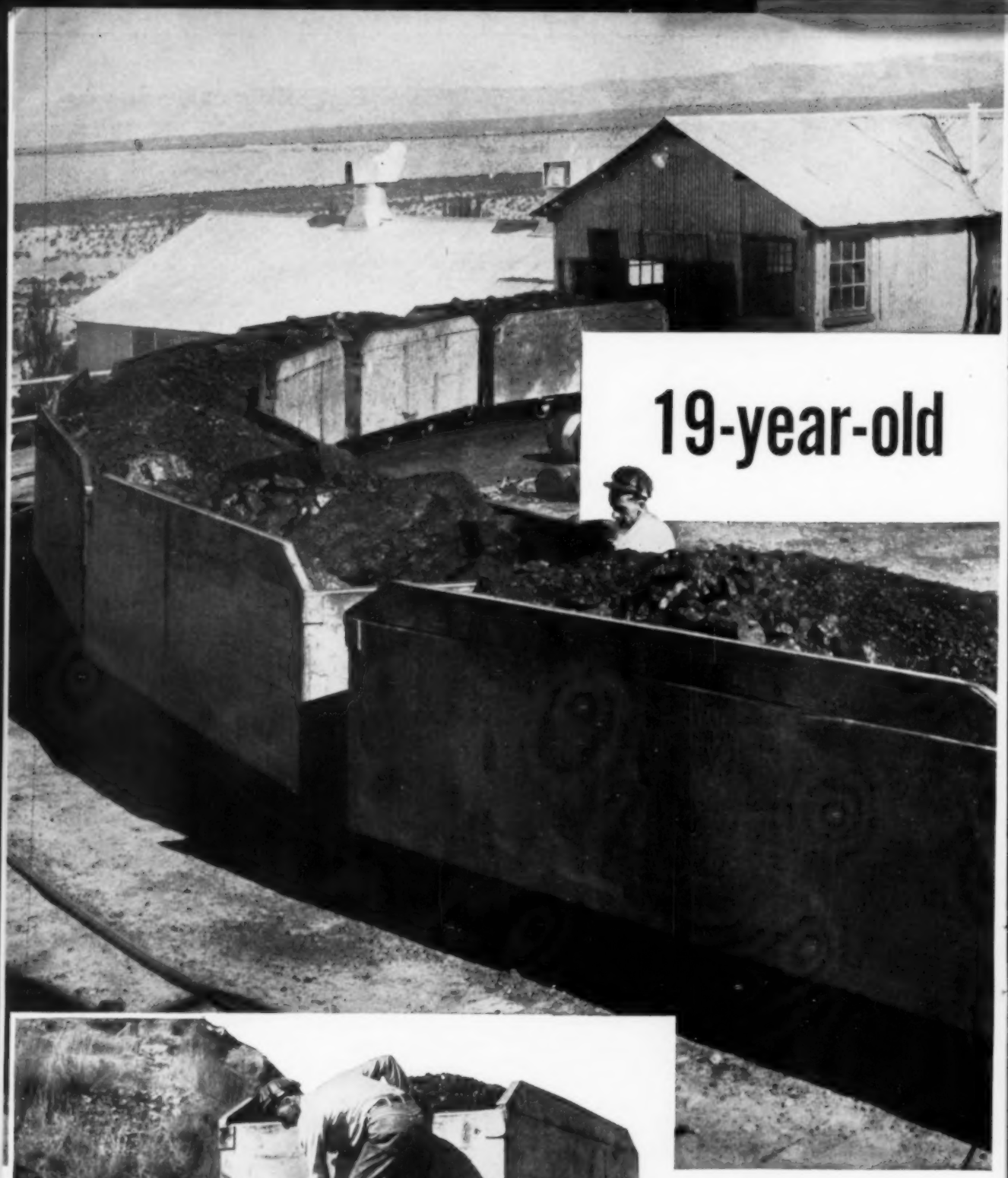
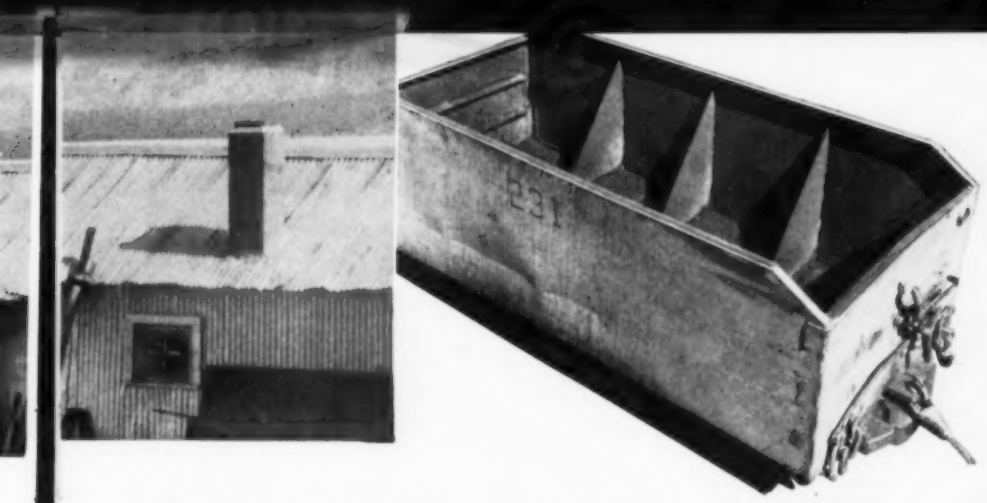


19-year-old

Be sure to visit
United States Steel Booth
at the Mining Show
Los Angeles, Calif.
Oct. 1st. to 4th.



COR-TEN cars at Columbia Mine

still "too young to retire"

Two hundred mine cars made of USS COR-TEN Steel have been in continuous service at Columbia Coal Mine in Utah for 19 years. Had they been built of steels ordinarily used, they would have been on the scrap heap long ago. Yet, the cars are still in good condition, and have a lot of life left in them. James Cassano, mine superintendent, says, "As far as the *steel* in these cars is concerned, some of them might hold up for another 20 years."

The mine has a total of 326 coal cars —all made of USS COR-TEN Steel. The cars are 5½ feet wide, 13 feet long, and 42 inches high. The sides of each car are fabricated from 3/16-inch COR-TEN plate; the ends and bottom are of ¼-inch COR-TEN plate. Average car capacity is six tons of coal.

In 1955, the mine and its 285 miners produced 581,554 tons of high volatile bituminous coking coal, subjecting the cars to constant rigorous service. Corrosive conditions in the mine are extremely bad, and because of the steep grades the cars travel, in and out of the mine, collisions are not infrequent. Thus, the COR-TEN Steel in the cars has had to cope with two destructive forces.

But high strength plus high resistance to corrosion are USS COR-TEN's big advantages. It has **4 to 6** times as much resistance to atmospheric corrosion as ordinary structural steel, 2 to 3 times that of copper steel.

All three USS High Strength Steels —COR-TEN, MAN-TEN, and TRI-TEN— enable mining equipment to give far more service per dollar of cost than carbon steel. They have a 50% higher yield point, and, in varying degrees, offer greater resistance to wear, fatigue, abrasion and impact. These USS High Strength Steels are used to replace carbon steel in the vital parts of mine cars, dozers, shovels, drag lines and other such equipment to increase service life without increasing dead weight. Where the use of thinner sections is feasible, they can frequently (1) reduce equipment weight without reducing its strength, or (2) increase the size and capacity of equipment without increasing the total weight or the power needed to move it.

For more complete information, write United States Steel, Room 2801, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

See "THE UNITED STATES STEEL HOUR"—Televised alternate weeks—Consult your newspaper for time and station.

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NATIONAL TUBE DIVISION, PITTSBURGH • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS HIGH STRENGTH STEELS

USS MAN-TEN • USS COR-TEN • USS TRI-TEN

6-2469

UNITED STATES STEEL

A TRULY PORTABLE BOND WELDER

Is easy to handle even in low coal. Thin design permits easy removal from cars. A sturdy, dependable unit that can be quickly and easily hauled to the job and put to work immediately.

Quick change taps provide proper welding current for all requirements.

Put an end to your welding problems with a GUYAN Portable Bond Welder.

Full descriptive bulletins available . . . Write for yours

GUYAN MACHINERY CO., Logan, W. Va.

Coal or Refuse flows into truck from Neff & Fry Bin

The bin at the right has active capacity for 200 tons of refuse in pieces up to 25 lbs. The other bin will hold over 100 tons of 2" maximum stoker coal.

Coal and refuse are hauled away in trucks. All the driver need do is spot his truck under the proper gate and pull a lever. The material flows into the truck by gravity.

The materials are loaded into the bins by conveyors from the mine. Production can proceed steadily due to the storage capacity of the bins.

The use of Neff & Fry Bins at coal mines has become common practice.

You are invited to write or phone us for details regarding appropriate installations at your mines.

NOT EXPORTED
EXCEPT TO CANADA AND MEXICO.

THE NEFF & FRY CO.
228 ELM ST. • CAMDEN, OHIO

SUPER-CONCRETE STAVE STORAGE BINS

Foreign News *(from 142)*

costs down, the Belgian collieries get a per-ton subsidy until 1958 from the Dutch and German collieries, by a special arrangement under the Schuman Plan. In addition, large grants and loans for modernization have been issued by the Belgian Government from funds provided through Marshall Aid. The colliery involved in this catastrophe, Charbonnages du Bois du Cazier, has been getting Marshall funds to sink its third shaft, still under construction.

The question arising is whether the Belgian mines take an undue risk on human lives; and, since so many of these are non-Belgian lives, the question is international. Belgian safety regulations have been internationally approved. The question is whether they are observed and enforced.

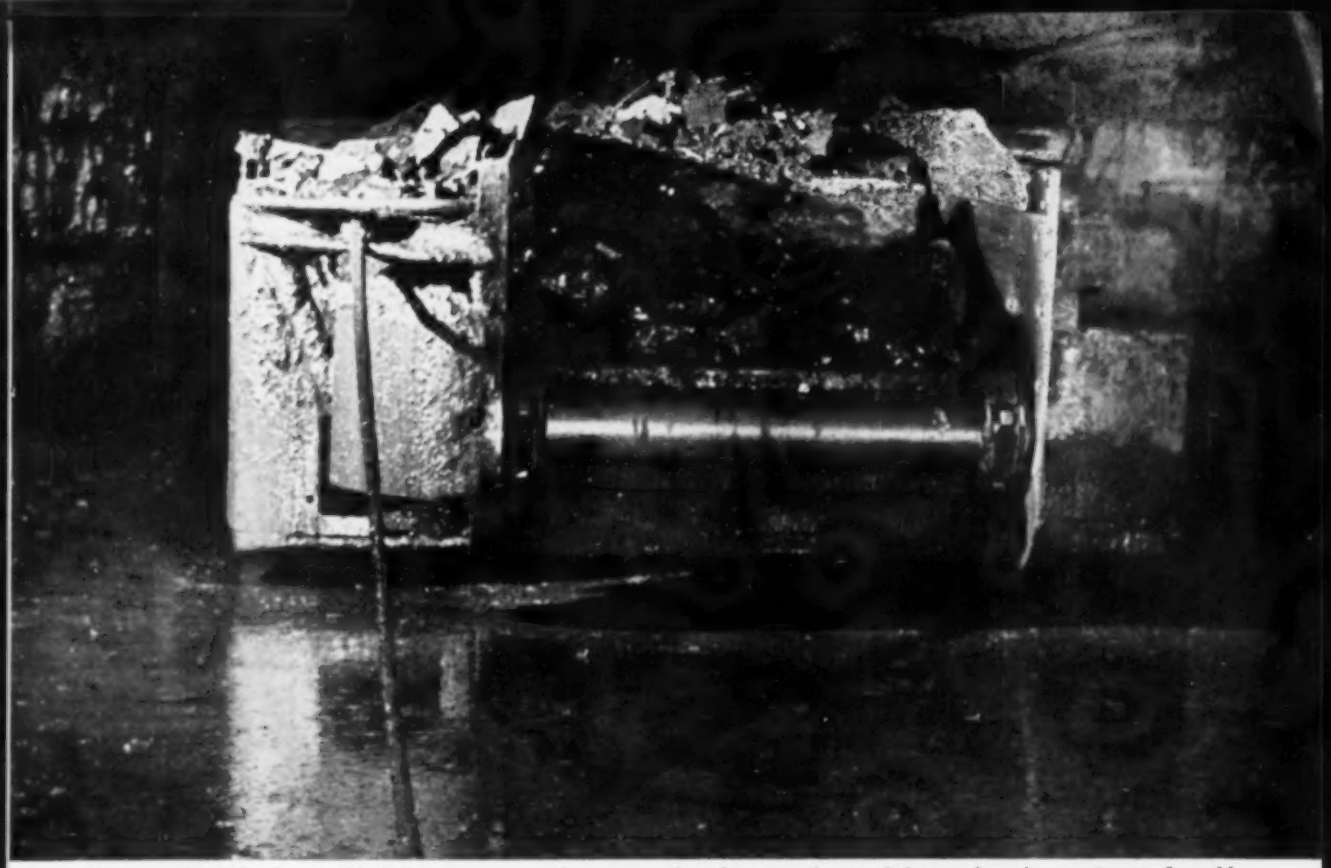
This makes it important to know what did happen at Bois de Cazier. The immediate cause was a fire in the shaft; but the fire had raged 1½ days before safety workers, discovering they needed fire-extinguishers, had to raise them from nearby factories and apartment-blocks in an urgent radio appeal. At the same time, too, they broadcast an appeal for the address of a company manufacturing asbestos fire-proof clothing.

The casualty roll being international, rescue interest was international. But an offer of help from a German colliery rescue organization at Essen was refused on the ground that there was only limited space for rescue workers. The Germans were finally called in on the fifth day, but Belgian authorities insisted that it was only for the sake of a German mobile laboratory which facilitated analysis of air samples from different levels. But it was a German engineer who volunteered to make a perilous reconnaissance descent on the end of a rope below 3,000 ft. Earlier, Belgian authorities had said there were no volunteers. French help did not wait to be refused, but came from Douai to the pithead, bringing radio-phone equipment which the Belgians lacked.

Pithead conditions were marked by confusion. A young American engineer arriving to offer help left because he could not find any responsible person to whom he could make his offer. When reporters discovered there was a Briton in the pit—a man working for a firm of mine-gas consultants—it took four of them over 2 hr to learn his name.

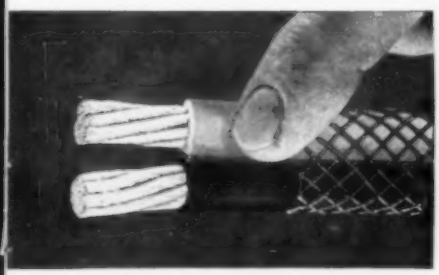
The cause of the catastrophe was a hopper-wagon, which fell down the mine-shaft, shearing some electric cables, which created an arc but continued to function. The cables were encased only in wood, and, it seems, they were not even protected by being lodged in a groove down the pit-wall. Nobody has been able to get an answer to what it was that actually caught fire; nor why, if an arc had formed and the circuit breaker had not operated, current had not been switched off.

Bois du Cazier is an old pit. Its operation goes back a century. In 1954 it produced 170,000 tons, and made a net profit of slightly more than $26,000. It

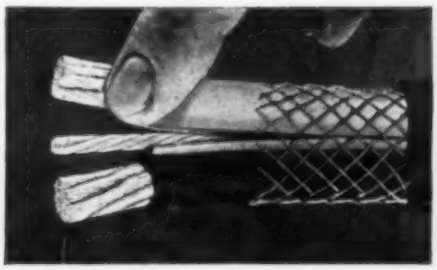


2-year study of shuttle car cable failures gave Anaconda engineers the information they needed to produce the new Securityflex cable.

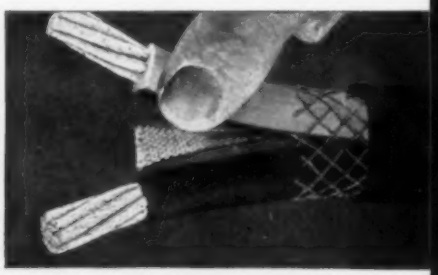
We engineered this cable "inside out"— to give you longer cable life



New Neoprene insulation compound gives Securityflex rugged *inner* strength.



New flat stranding of grounding conductor prevents broken wires and failures.



New nylon Anti-Short Breaker Strip* delivers amazing crush resistance.

Before designing the new Securityflex* cable, Anaconda engineers checked thousands of shuttle car cables of all makes to see why they failed.

Using this study, Anaconda engineers designed the new Securityflex* cable—from the *inside* out. To combat the effects of constant flexing and impact, and occasional crushing, new neoprene insulation, new stranding of grounding conductors, and new nylon Anti-Short Breaker Strip were added to give it rugged *inner* strength as well as tough outer strength.

In addition—full, 50% grounding wire insures greater electrical protection, longer life, and extra safeguard against excess tension. Anaconda's flat, service-proven grounding wire allows more cable on reel—will not cut insulation if cable is crushed by runovers. Millions of feet of new Securityflex have been sold without a reported failure of grounding conductor. Insist on full-size grounding conductor for safety.

The Man from Anaconda has full details and samples for you. Call today, or ask your distributor. Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.

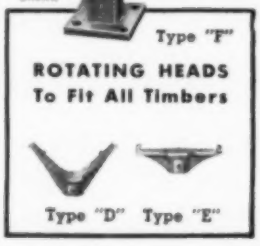
*Trade Mark

SEE YOUR **ANACONDA®** DISTRIBUTOR FOR **MINE CABLE**

New Hi-Speed TIMBER JACK is TWO TIMES FASTER!

The dependability and safety of a screw-type jack with the fast operation of a crank! That's the combination offered in this new Simplex No. 642 Timber Jack. In mines, where fast timbering is often vital, this jack more than pays its way in doing the work of several men in raising and locating roof timber. With the head on a swivel, it can work right against a wall or rib. Capacity is 6 tons and there are five models with minimum heights as low as 3-ft., 6-in. and with maximum heights of 9-ft., 6-in.

Gear Cover Not Shown



Ratchet Lowering Jacks for Thick, Medium and Thin Seams

Raise or lower notch-by-notch for greatest safety. Three sizes for all types of seams. Also ideal for lifting or skidding mine machinery, re-railing mine locomotives. Capacity 5 tons. Double-lever sockets permit lifting in close quarters.

A COMPLETE LINE OF MINE JACKS

The Simplex line also includes ratchet and screw mine roof and timber jacks, post pullers, track jacks, anchor jacks for use with conveyors, hydraulic jacks and the famous Re-Mo-Trol and Jenny "Center-Hole" Pullers.

Write for Details in General Catalog No. 56 and Mines 56.

Emergency Jack with 4-way Lift Power

Here's the jack that does a variety of jobs. It lifts 15 tons on the cap, on the toe, on the capshoe or at intermediate heights with a chain sling. The base tilts, allowing it to lift, push or pull at any angle.

WORLD'S LARGEST MFRS. OF INDUSTRIAL MECHANICAL AND HYDRAULIC JACKS

SIMPLEX

RE-MO-TROL UTIL-A-TOOL **JACKS** JENNY ROL-TOE

TEMPLETON, KENLY & CO.
2501 Gardner Road
Broadview, Illinois

Foreign News *(Continued)*

has been years since the colliery ceased to be mainly a private undertaking, extra money being pumped into it when a shareholding interest was taken by the nearby Amerceour (Bitter Heart) Colliery. It is not ranked among Belgium's more backward and "marginal" mines, many of which will close under the competition of western Europe's Schuman Plan. It was also judged sound enough to receive aid from the Belgian Government via $15 million in Marshall plan funds for development and modernization.

It is nearly a year since the Italian Government expressed dissatisfaction with the high accident rate in Belgian mines, then suspended further recruitment. Negotiations last February for fresh recruiting broke down when the Italians demanded that their trade unions be allowed on the safety committees. Since then the Belgians have had to go further afield for miners, recruiting in Spain and Greece.

Now there is the risk that the 45,000 Italians in Belgium may be withdrawn by the Italian Government or leave of their own accord. If this happens Belgian mines will be crippled, since Italians account for half the workers. Italian Labor Minister Ezio Vigorelli, who was an early visitor to the pithead, demanded a thorough investigation and an improved system of safety enforcement.

A new factor in the picture is the High Authority of the European Coal and Steel Community. The Schuman Plan Treaty gives the ECSC little right to intervene in labor matters. But because of the calamity and strong Italian demands, the High Authority has proposed to the Belgians that the ECSC be permitted to take part in an inquiry. It has also announced it will call an international conference of the six member Governments to improve safety regulations. This is expected to end in an international safety code, perhaps even constitution of a six-nation safety enforcement corps.

Luckily for the Belgians the half-dozen youngsters of 16 yr and under, listed among the dead and presumed dead, were all Belgians. There is no law against employing children in the mine, except that they must attend school until they are 14. The Belgians proved very sensitive about this, and a journalist's attempt to pose questions about it to Mines Department Director Andre Vandeheuvel in one of his broadcast press conferences resulted in the microphone being cut off. Though all the children were Belgians, there doesn't seem to have been any reason why a young Italian, or any other national, should not have been accepted for underground work if he had applied.

Belgium has been criticized for permitting men underground with little training. The Italian Government's grumbles that their men go underground within two or three weeks after they first see a colliery. Moreover, special pressure had to be applied for the erection of "safety" posters in Italian, French and Flemish.

The problem of enforcing safety regu-

(Continued on p 158)

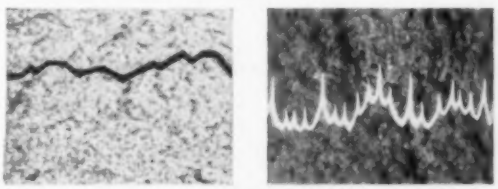
NOW . . . step up dragline output . . . WITH ALL-NEW BUCYRUS-ERIE BUCKETS

You swing more payload, less deadweight every hour with the new Bucyrus-Erie dragline buckets. A combination of an all-new, lightweight yet strong design and a new long-wearing material makes it possible.

The new material is BECOLOY, a special steel alloy with a tough, fibrous structure ideally suited to dragline bucket service. The new design features a "slicing-action" lip that penetrates material quickly, and a tapered basket shaped to load full and fast. Proper flaring and balance minimize spilling and bobbing. The inside design is smooth and the arch is extra high for fast, clean dumping.

Your Bucyrus-Erie distributor can help you select the right size and model of these new buckets to fit your job, to bring you better output performance than ever before. Three types are available—light, medium and heavy-duty —with either solid or perforated baskets.

BECOLOY . . . **exclusive new alloy for Bucyrus-Erie dragline buckets.**



The BECOLOY fracture surface at right shows the tough, fibrous structure that imparts high strength to this alloy. Ordinary steel fracture surface, at left, has a coarse, crystalline pattern. 19856

BUCYRUS ERIE

SOUTH MILWAUKEE, WISCONSIN

NEWCOMER CARBIDE MINING TOOLS *for greater production... EVERYWHERE!*

NEWCOMER CARBIDE and CARBIDE MINING TOOLS are made in one plant specializing in Controlled Quality Carbide and Carbide Tools.

NP MACHINE BITS

Designed with a durable alloy steel shank, heat treated to withstand considerable abuse, and properly shaped NP Controlled Quality Carbide Tips that give maximum cutting with minimum power consumption.

NP DRILL BITS

The drill with the twist that counts ... developed through intensive research to commercially produce a drill head combining the exceptional wear resistance of NP Cemented carbides with the free-cutting, non-clogging features of the old style twisted steel bit.

NP ROOF DRILL BITS

Extremely satisfactory in use even under abnormal conditions. Available in both slotted and solid spade types. Tipped with NP Controlled Quality Carbide, these bits assure faster drilling with less feed pressure than normally required.

Send today for Mining Tool Catalog MT-553

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Latrobe, Pa.

General Sales Office:
312 Franklin Ave., Pittsburgh 21, Pa.
Other sales offices in principal mining areas.

Personal Notes

H. C. Livingston, Truax-Traer's vice president in charge of operations since 1952, has been elected president of the company. Mr. Livingston replaces **A. H. Truax**, chairman of the board, who served in the presidential post since the retirement of **R. E. Snoberger** in 1955. Mr. Livingston's election is the culmination, thus far, of a 28-yr climb in the coal industry, during which he has been charged with more and more responsibility. A westerner (hometown: Denver), Mr. Livingston sought and found a job in 1927 as draftsman and general engineer with the Union Pacific Coal Co. During a 24-yr term with Union Pacific he moved from mining engineer to chief engineer, to general superintendent and to assistant general manager. Thoroughly familiar with each phase of the company's operation he was appointed vice president-operations on Jan. 1, 1946. On Jan. 1, 1952, six years later, he moved to the capacity of vice president in charge of operations. His election as president came early in August after an announcement by Mr. Truax.

H. C. Livingston

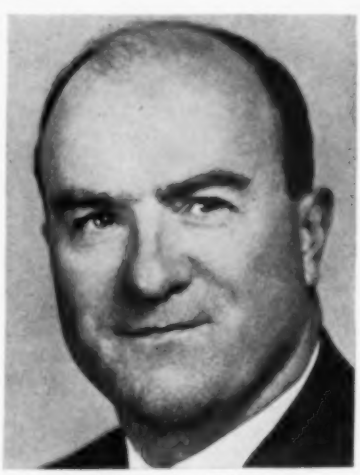
J. C. Kirby, production engineer, low volatile division, Eastern Gas & Fuel Associates, has been advanced to superintendent of the company's mine in Helen, W. Va. He replaces **J. H. Benedict**, now on leave of absence. EG&FA has also promoted **John J. Kodak**, a former assistant mine foreman at the company's Keystone mine (W. Va.) to general mine foreman at Stotesbury No. 10.

Harry LaViers, president of the Southeast Coal Co., Paintsville, Ky., has been elected a director of Truax-Traer Coal Co. Truax-Traer is sales agent for Southeast Coal.

John W. Tieman, Bituminous Coal Research staffer since 1953, has been promoted to supervising engineer at the BCR laboratory in Columbus, Ohio. Acting under **James R. Garvey**, BCR's assistant director of research, Mr. Tieman will supervise all activities at the laboratory.

Charles B. Lakin has been elected vice president of operations, for the Berwind-White Coal Mining Co. Mr. Lakin, associated with the company's operations for a number of years, will remain at his headquarters in Philadelphia.

In preparing for an expanded program of bituminous production, the Penn-Texas Corp. last month elected **Thomas L. Aitken** vice president in charge of coal operations and president of the corporation's Pennsylvania Coal & Coke Div. As a top production executive Mr. Aitken will supervise all operations of the corporation's bituminous mines in central Pennsylvania. A director of the Central Pennsylvania Coal Producers Association and a member of its Wage Scale Committee, Mr. Aitken was formerly vice president of operations for the Ebensburg Coal Co. In his new production post he plans to embark on an immediate program of expanded production.



Thomas L. Aitken

John W. Bodycomb, former superintendent of the Morley mine (Colo.), Colorado Fuel & Iron Corp., has been appointed assistant superintendent of the Frederick mine, Valdez, Colo.

Association Activities

A $300 annual scholarship in mining engineering has been established at Virginia Polytechnic Institute by the Virginia Coal Operators Association. High school graduates from eight Virginia counties are eligible (Tazewell, Dickenson, Wise, Lee, Scott, Russell, Buchanan and Montgomery).

"This coal **won't break up** in shipment"

AIRDOX

NON-EXPLOSIVE MINING METHOD

Cuts Costs 5 Ways

- Produces less fines in face preparation
- Rolls coal forward for faster, easier loading.
- Easier on "tender" roofs—cuts shoring, bolting
- Lowers cleaning costs by minimizing fines
- Reduces degradation—no shattered coal

That's because it was Airdox-mined. Airdox dislodges coal from the face so gently that there are no shattercracks created to cause degradation during shipment. Users get the coal size they order; shippers get an extra quality feature that boosts sales. Best of all, this modern non-explosive mining method actually cuts production costs while yielding a higher quality product.

Find out how easy and simple—and profitable—it is to use Airdox in your mine. Write for all of the important details.

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Library, Pennsylvania
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"THIS LUBRICANT STOPPED THE 'FLAKING' OF ROLLING MILL GEARS"

says—VANADIUM-ALLOYS STEEL CO.

"The herring-bone gears in the drive unit of our 6-stand, 10-inch mill that rolls our high speed tool steels became noisy. Inspection showed definite signs of flaking of gears. This was in 1939. It was then we started to use LUBRIPLATE in them and we have not encountered any flaking trouble since."

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Purchasing Agent

REGARDLESS OF THE SIZE AND TYPE OF YOUR MACHINERY, LUBRIPLATE LUBRICANTS WILL IMPROVE ITS OPERATION AND REDUCE MAINTENANCE

LUBRIPLATE LUBRICATION MAKES CARS AND TRUCKS RUN BETTER AND LAST LONGER

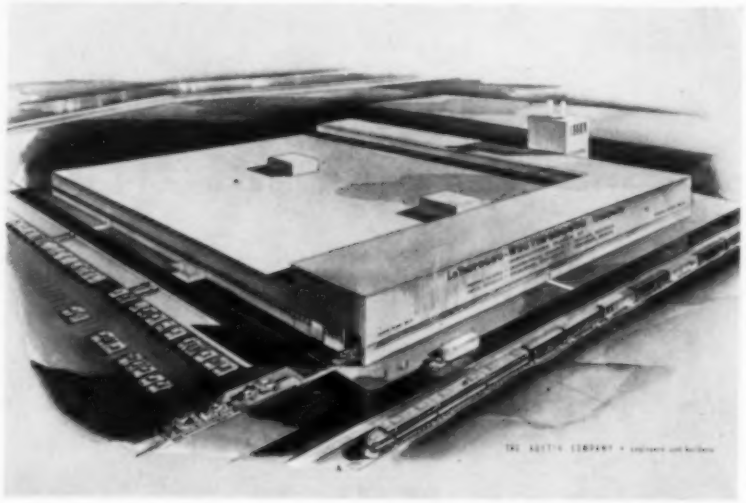
LUBRIPLATE H.D.S. MOTOR OIL . . . THE OIL THAT NEEDS NO ADDITIVES

For nearest LUBRIPLATE distributor see Classified Telephone Directory. Send for free "LUBRIPLATE DATA BOOK" . . . a valuable treatise on lubrication. Write LUBRIPLATE DIVISION, Fiske Brothers Refining Co., Newark 5, N. J. or Toledo 5, Ohio.

Among the Manufacturers

Two of the oldest heavy-duty truck makers in America, Mack Trucks, Inc., and Brockway Motor Co., were merged, with Mack gaining control of Brockway through outright purchase and a special purchase-rental agreement. Mack says it will continue to operate Brockway as a separate division of Mack Trucks, Inc. No purchase price was disclosed, but Mack says it is buying Brockway's inventory and renting Brockway's plant and manufacturing facilities. The agreement gives Mack an option to buy the rental facilities. The Brockway line, Mack says, will be continued. In fact, the acquisition is expected to permit both companies to expand. (Mack sales for the first 6 mos of 1956 were $126,609,541, an all-time high and a 51% gain over the same period last year. Net earnings were $5,754,031, or $3.05 a share. Last year earnings in the same period were $3,292,486. Brockway sales last year totaled $14,055,387. They are currently estimated running at 15% above last year.)

LeTourneau-Westinghouse Co. announced a $9 million building and tooling program that will boost operations in its plants at Peoria, Ill., Toccoa, Ga., and Indianapolis, Ind. Two-thirds of the expansion money ($6 million) is earmarked for a new factory (drawing) and tooling in Peoria, where LeTourneau-Westinghouse turns out rubber-tired earthmover prime movers. In Toccoa, where the company manufactures electrical components, a 40,000 sq ft building has been completed. An additional $1.5 million will be spent on machine tools and equipment. Production at Toccoa will be raised 50%, the company says. In the third part of its expansion, LeTourneau-Westinghouse will invest more than $1 million in machine tools and manufacturing equipment at its Indianapolis plant (Adams motor graders, TraveLoaders).



Dresser Mfg. Div., Dresser Industries, says it will build a $1 million plant in Wellsboro, Pa., to expand production of couplings and pipe fittings. The plant will contain 100,000 sq ft, employ between 200 and 300 persons. Estimated completion is 1957.

Syntron Co., Homer City, Pa., is organizing a West Virginia Sales Co. in South Charleston, W. Va. Wallace P. Smith has been named vice president and will take charge of the sales territories of West Virginia, Virginia and Kentucky.

Lee-Norse Co., Charleroi, Pa., is erecting an addition to its plant and is subcontracting Lee-Norse products (miner, Jitney, mine portal bus, mine scooter) in the expectation of a 100% production increase by 1957.

Ohio Brass Foundation scholarship winners, George W. Nelson, Mansfield, Ohio, and Robert T. Cunningham, Barberton, Ohio, were guests at Ohio Brass Co.'s factory at Barberton. Mr. Cunningham will use the scholarship to study mechanical engineering at Purdue; Mr. Nelson plans to study chemical engineering at Case Institute.

General Electric's Metallurgical Products Dept. (formerly Carboloy) has set up engineering seminars for customers. The seminars will be on advance design and application of metallurgical products, including carbides.

Bristol Co., Waterbury, Conn., has opened a Denver office. R. G. Tower, now Chicago manager, will direct.

Thor Power Tool Co., Aurora, Ill., is constructing a branch office building in Indianapolis, Ind. The unit is the company's 25th branch and will serve cus-

195hp

for BIG Performance

HUBER-WARCO 5D-190 GRADER

The Huber-Warco 5D-190, with torque converter and full power-shift transmission, will handle the toughest grading jobs smoothly and quickly. A perfect balance of weight and power gives highest working efficiency. Hydraulically cab-controlled blade movement (90° either side with no manual adjustments) and power-sliding moldboard are added performance features.

For a demonstration—See your nearest Huber-Warco Distributor

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MARION, OHIO, U. S. A.

Road Machinery

CABLE ADDRESS: HUBARCO

ROAD ROLLERS • MOTOR GRADERS • MAINTAINERS • GRINDERS

Manufacturers *(Continued)*

tomers in central and southern Indiana, northwestern Kentucky and Louisville, Ky.

Atlas Powder Co. has formed a Sales Development Section within its Explosives Sales Dept. William T. Mahood, former manager of the Contractors Section, is in charge.

Kennametal, Inc., purchased 1,200 acres near Latrobe, Pa., its home office, to expand manufacturing and, at the same time, decentralize facilities. The area will be developed quickly, Kennametal says. Decentralization by the firm was begun 5 yr ago with construction of a plant at Bedford, Pa. Hard hit by flood in 1954 ($417,000 damage), Kennametal has been building and acquiring plants in other states.

The Daniels Co., Contractors, Inc., Indiana, Pa., announces three executive changes: John W. Hough, vice president in charge of engineering; J. B. Richardson, vice president in charge of operations; and Gordon H. Dunn, general purchasing agent.

Russell W. Knode, export manager for the Jeffrey Mfg. Co., Columbus, Ohio, is being made manager of field offices, mining division. Mr. Knode has been with Jeffrey for 20 yr and will be succeeded as export manager by John R. Jeffrey, a sales engineer for 9 yr.

Richard E. James, Jr., Birmingham (Ala.) branch service engineer for Thor Power Tool Co., Aurora, Ill., was appointed manager of the company's new Indianapolis branch. Thor also announced the appointment of John P. Bank to the job of works manager in Aurora.

Voto Manufacturers Sales Co., Inc., Steubenville, Ohio, is authorized to sell Carboloy carbide mining tools.

Gar Wood Industries, Findlay Div., Findlay, Ohio, hired Robert O'Connell former Clark Equipment Co. assistant service manager, to direct service of Gar Wood construction equipment in the capacity of service manager.

Donald C. Kilpatrick moved from his job of district representative in eight states for Koehring Co., Milwaukee, Wis., to the post of parts sales promotion manager in Milwaukee.

Gordon K. Owen joined the Calcium Chloride Institute, Washington, D. C., as field engineer. From his headquarters in Lexington, Ky., Mr. Owen will provide engineering service to calcium chloride users in Indiana, Ohio, Kentucky and Tennessee.

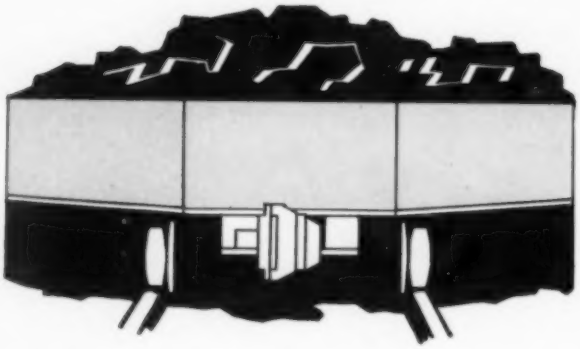
Karl F. Ewerhardt former advertising manager, was named to fill the newly-created post of assistant general sales manager for Leschen Wire Rope Div., H. K. Porter Co., Inc.

Gatti Engineering Co., Forty Fort, Pa., is authorized by the Salem Tool Co., Salem, Ohio, to sell Salem-built McCarthy coal recovery drills. Gatti will cover the anthracite region in eastern Pennsylvania.

The reorganization of Gar Wood Industries construction machinery sales department has been announced by the company. David J. Davis, former sales manager of tractor equipment sales, has been named general sales manager and will direct construction machinery sales activities from new headquarters in Findlay, Ohio, home of Gar Wood's Construction Machinery Div. The company, meanwhile, is transferring all tractor equipment sales activities from Wayne, Mich., to Findlay.

Two new Euclid dealers were appointed by Euclid Div., General Motors Corp. to sell the company's line of scrapers, rear-dumps, bottom-dumps and crawler tractors. Anderson Equipment Co., situated in the suburbs of Pittsburgh, Pa., represents Euclid in western Pennsylvania and part of West Virginia. Archer Tractor & Machinery Co., 1118 S. Main St., Salt Lake City, Utah, represents Euclid in southwestern Wyoming and part of Nevada.

it's low—
it's wide—
it's practical!



After all, the problem is clear. What type of mine car will carry the most tons of payload per dollar invested?

With its "axless" design the Differential low height mine car can haul more cubic feet of coal within any given length, width and height than any other make. Take a look at your haulage costs and investment. What is the ratio of payload tons capacity to dollars invested in rolling stock? And—the lower the roof, the greater the advantage with Differentials!

OTHER DIFFERENTIAL PRODUCTS

Mine Locomotives, Mine Supply Cars, Rock Larries, Mantrip Cars, Rotary Dumpers and other dumping devices, and Complete Haulage Systems.

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DIFFERENTIAL
STEEL CAR COMPANY
FINDLAY, OHIO

SINCE 1915 PIONEERS IN HAULAGE EQUIPMENT

Mathies Mine Hauls 50% More Coal with General Electric 50-ton Mine Locomotives

Mathies Mine's three 50-ton G-E mine locomotives handle heavier loads with ease and efficiency. In fact, over-all performance of their first G-E locomotive was so good that Mathies bought two more!

The Mathies Mine in Finleyville, Pennsylvania (fourth largest coal mine in the world) daily produces 13,000 tons of clean coal. Their round-the-clock mining operation naturally requires the very finest locomotive fleet available.

General Electric mine locomotives provide Mathies Mine with these 3 important benefits:

1. INCREASED HAULING CAPACITY—Daily tonnage hauled has ***doubled*** since these locomotives were installed. Now Mathies' 2½% grades no longer impede haulage from mine to yard. Average trains number 60 cars hauling more than 800 tons per train.

2. INCREASED EFFICIENCY—G-E mine locomotives are specifically designed for high-speed, heavy-duty operation. As a result Mathies now moves heavier loads faster and more efficiently than was formerly possible. Haulageway congestion and production delays have been reduced.

3. LOWER OPERATING COSTS—Because of their four-axle, swivel-truck design, these locomotives ride smoothly over the rails. Result? There's less pounding and jarring. That means less wear . . . less maintenance on both locomotives and tracks.

WHAT ARE YOUR HAULAGE REQUIREMENTS? From the wide range of General Electric industrial and mine locomotives—diesel-electric and straight-electric, for both underground and surface haulage—there is one fitted to your needs.

For a survey of your haulage requirements, without cost or obligation, call your local G-E Apparatus Sales Representative. General Electric Company, Locomotive and Car Equipment Dept., Erie, Pa. 120-87

GENERAL ELECTRIC

THE SHORTAGE OF SCIENTISTS AND ENGINEERS:

A Threat to Economic Progress

THERE are two paramount reasons for concern over the serious shortage of scientists and engineers that now confronts the United States:

- The first reason, with which this editorial deals, is that continued expansion of our economy and further increases in our living standards are threatened unless we train more scientists and engineers and use them more effectively.
- The second reason for concern is that we run the risk of falling behind the Soviet Union in the technology so essential to national security. The consequences of losing this race to the Russians are not comforting. (The possibility that this might happen over the next few years was discussed in an earlier editorial in this series.)

The crucial contribution of scientists and engineers to the well-being of the American people has been to find ways of making better use of limited resources, to make equipment more productive, to develop new and better products that enrich our lives, to enable us to live longer and be healthier. They have made this contribution with greater success in the last 15 years than ever before, but it has required progressively more resources and more trained people.

During this 15-year period our annual production of goods and services, in dollars of constant purchasing power, has almost doubled. Since our total population has increased only 25 percent, this has meant a tremendous rise in the economic well-being of the American people as a whole. But in accomplishing this, the number of scientists and engineers has been more than doubled.

Tasks for Research

If the American economy is to continue to grow and if our living standards are to show further improvement, the work of scientists and engineers must be stepped up even more in the years ahead. Unless answers to several pressing problems are found through intensified research efforts, economic progress will become increasingly more difficult.

Productivity per hour of labor must be increased at a faster rate. Improved medical care has greatly increased the number of people who attain retirement age, and sharply higher birth rates since the war will mean larger numbers of children in school and college. Meantime, because of low birth rates during the depression, the number of people reaching working age is not rising nearly so fast. The result is that over the next 20 years our population will increase by about one-third, while the total manhours worked are not expected to increase more than 15 percent. So, simply to maintain the same living standards for a rising population — with no provision for additional improvements — ways must be found to enable each worker to produce for more dependents.

It is primarily to the scientists and engineers that we must look for help in making human labor more productive. This will require enormous increases in our power

resources. We will need to make more effective use of our existing fuel supplies — coal, oil and natural gas. And we will have to devise economically practical means of tapping other energy sources, particularly nuclear power and new rocket fuels.

Also, better ways must be found to use scarce and low-grade raw materials. Thanks to great strides in metallurgy and mining techniques, we are now utilizing sources of copper and iron ore that, for all practical purposes, were not available to us only ten years ago. Similar strides are needed in the mining and processing of bauxite if low-grade domestic ores are to help satisfy a fast-growing market for aluminum. And stubborn technical obstacles in the area of "high temperature" metals—such as nickel, cobalt, columbium, tantalum and titanium — are impeding progress in jet and turbine engines.

These are only a few of the challenging tasks that demand intensified research and engineering activity in the years immediately ahead if the United States is to continue to raise living standards. We need more houses, schools and highways for a rising population, more medical research to reduce further the ravages of illness, more research in chemistry and other sciences to sustain the flow of new and improved products that are so essential an ingredient of our economic progress.

Ceiling on Growth

American industry has indicated that it is ready to meet the challenge and undertake vastly expanded research programs. A recent survey conducted by the McGraw-Hill Department of Economics revealed that total research and development expenditures of American industry were almost $5 billion last year, 29% higher than in 1953. By 1959 business plans to be spending well over $6 billion on research and development. And the total could well prove to be much higher, based on the trend of recent years.

But industry's programs for research and development cannot be carried out unless enough qualified research workers and engineers are available. Ernest R. Breech, chairman of the Ford Motor Company, recently described the supply of engineers as the "ceiling on our future growth." He gave force to his point by announcing: "If 900 qualified engineers were to approach us next week looking for jobs, we would hire every one." The U. S. Bureau of Labor Statistics found in interviews with some 200 large companies at the end of 1954 — a recession year — that at least half were unable to hire enough research scientists and engineers to meet their needs. A third of the companies reported substantial shortages of technical personnel.

The shortage of technically trained people, furthermore, is becoming more acute. The number of engineers and scientists now being graduated is only about enough to cover replacement requirements, while the needs of industry, government and education are mounting every year. According to the best information available — as indicated in the first editorial in this series — these needs are now about twice as great as our current engineering graduating classes and annual production of scientists with Ph. D. degrees.

To perform the research needed to remove roadblocks to our economic progress — and at the same time hold our own in the technology essential to our security as a free nation — we must have an adequate supply of men and women with engineering and scientific training. Instead, we are faced with an acute shortage, now and for several years to come. Reasons for the shortage and proposals for working our way out of the shortage will be discussed in the remaining two editorials in this series.

This is one of a series of editorials prepared by the McGraw-Hill Department of Economics to help increase public knowledge and understanding of important nationwide developments of particular concern to the business and professional community served by our industrial and technical publications.

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Donald C. McGraw

PRESIDENT

McGRAW-HILL PUBLISHING COMPANY, INC.

Foreign News *(from p 148)*

lations is not only a problem of making the colliery owners spend money. The miners are paid on a tonnage basis, a condition not conducive to safety. In fact, it is common for miners to immobilize safety fuse-boxes. Roof-support and shoringup is also frequently ignored.

GREAT BRITAIN

According to provisional figures released by the Ministry of Fuel and Power, British coal imports during the first 28 weeks of this year have been almost halved, and miners have produced nearly 2 million tons more in the first 29 weeks of the year than they did last year. To date, imports have reached 3,514,200 tons, compared with 6,130,800 tons for the same period last year, a reduction of 2,616,600 tons. In March this year, the Minister of Fuel and Power, Aubrey Jones, told the House of Commons, that imports of American coal and also exports of British coal, would be cut by about 5 million tons each this year, which, in foreign exchange, is equivalent to a saving of $28 million. Total saleable out-

(Continued)

26

33

45

One mining company has 26 Stamler Car Spotters in use. Another has 33 and another has 45! Smart mining men repeatedly re-order Stamler Car Spotters as they change from other makes!

THE proof of the quality of any product is in the number of times the customers come back for a second helping. Will they buy once and then stop? Or will they come back with a repeat order? Obviously they must be pleased when they order the second time. So look at the figures above. Stamler customers don't merely repeat —they keep on repeating! *They order again and again and again!* Once they try their first Stamler Car Spotter they want nothing but Stamlers. The reason is no mystery. It's simply that Stamler Loading Point Equipment gets the coal out faster . . . more efficiently and at less cost. And Stamler Equipment is all-hydraulic which means practically no maintenance cost. *When are you going to think about ordering your first Stamler Car Spotter?*

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LOADING POINT
EQUIPMENT

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Books for Coal Men

Engineering Data

Engineering Formulas & Tables is a revised reference work for mining, civil, mechanical and electrical engineers. Sections include mathematics, measures, materials, gages, screws, mechanics, electricity and magnetism, hydraulics, structural data, reinforced concrete, pipe and fittings, steam tables and mathematical tables. *350 pp. $2.75. Lefax Publishers, Philadelphia 7, Pa.*

Ohio Mineral Report

Annual Coal and Non-Metallic Mineral Report reviews safety, mining activity and reclamation at Ohio mines for 1955. Included are 20 tables dealing with coal mining and seven on non-metallics. *175 pp. 6x9-in; paper. Department of Industrial Relations, Columbus, Ohio.*

Alabama Safety

Annual Statistical Report is a summary of the condition of safety at Alabama mining and industrial operations for the fiscal year 1954-1955. Included are brief descriptions of mines and the geology of the coal measures in Alabama. *126 pp. 6x9-in; paper. Department of Industrial Relations, Montgomery, Ala.*

Anthracite Flood Prevention

Flood Prevention in Anthracite Mines, by S. H. Ash, H. A. Dierks, D. O. Kennedy and P. S. Miller. This report gives a brief description of the work proposed under Projects Nos. 4 and 5 of the Conowingo tunnel system. Included are data on topography, geology, hydrology, plans, costs, construction schedules, and recommendations. *23 pp, plus maps. 8x10½-in; paper. $1. Bulletin 560. Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.*

Effects of Acid Mine Water

Corrosive and Erosive Effects of Acid Mine Waters on Metals and Alloys for Mine Pumping Equipment and Drainage Facilities by S. H. Ash, H. A. Dierks, E. W. Felegy, K. M. Huston, D. O. Kennedy, P. S. Miller and J. J. Rosella. This report offers data on metals and alloys for pumping equipment and drainage facilities in the anthracite region. Information is based on field tests. *46 pp. 8x10½-in; paper. Bulletin 555. Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.*

Business History

Designed for Digging, by H. F. Williamson and K. H. Myers. This work covers the 75-yr history of the Bucyrus-Erie Co. and shows how the company adjusted its policies and practices to trends in the American economy. *384 pp. $7.50. 8⅝x11¼-in; cloth. Northwestern University Press, Evanston, Ill.*

Truth and Fallacy About Acid Coal Mine Drainage by S. A. Braley. Available from the *Mellon Institute, 4400 5th Ave., Pittsburgh 13, Pa.*

Large Indiana Mine **SAVES TIME.. SAVES MONEY** *with assembled bolts*

The efficient operation shown above is among America's largest. Their bolting problems were solved when they purchased completely assembled West Virginia units with a small plate to reduce handling problems. Here is another satisfied West Virginia user, with a remarkable safety record, that finds the completely assembled bolt, plate and unit a money saving way to bolt.

America's Best Mines **BUY**
WEST VIRGINIA BOLTS *with confidence*

West Virginia STEEL & MFG. CO. HUNTINGTON, W. VA.

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BOX 316 HUNTINGTON, WEST VIRGINIA

Foreign News *(Continued)*

put of coal, both deep mined and stripped, the third week in July was 3,687,700 tons, a fall of 124,800 tons on the previous week but 280,000 tons more than in the corresponding week last year. Production for the first 29 weeks of this year was 126,335,600 tons, compared with 124,350,700 tons last year. Total distributed stocks at the week ending July 14 stood at 17,950,000 tons, an increase of 337,000 tons on the previous week, and compared with 13,893,000 tons at the corresponding period last year. Deep mined tonnage losses last week through vacation, disputes, etc. was 918,600 tons. Manpower at the week ending July 14 was 702,500 which was 400 fewer than the previous week. At the same time last year, manpower totalled 703,300.

CZECHOSLOVAKIA

Passive resistance is being exercised in the Ostrava coal mining district, according to a statement in *Nova Svoboda*, a daily paper issued at Ostrava. The paper says that during the past 10 yr more than 4 million metric tons of coal were not mined because of this single fact. Absenteeism in a number of mines, meanwhile, reached up to 30% during June, 1956. In a single weekend at least 10,000 metric tons of coal were unmined because of absenteeism, the paper estimates. One writer charges that the "loss of coal in the Ostrava area is the work of criminals. A considerable percentage of the miners," he concludes, "are criminal elements that just don't want to work."

JAPAN

Seven leading Japanese steel manufacturers have contracted to import 550,000 tons of coking coal from Communist China in the 12 mo beginning this month, according to the Fuji Iron & Steel Co., Tokyo. The contract was made in Peking between Chinese trade authorities and representatives of Japanese steel mills. Trade sources say the price $8.54 a ton f.o.b. Chinese ports, which would be $12.54 cost insurance freight (c.i.f), or delivery in Yawata, southern Japan. The Japanese, in turn, are expected to export galvanized iron sheets and other steel products.

UNION OF SOUTH AFRICA

To relieve railways of the burden of hauling coal the South African government is investigating the use of atomic power, despite its higher cost. The reason —heavily-burdened railways.

FRANCE

From Paris, Robert E. Farrel, World News correspondent reports that the six nations that make up Europe's Coal & Steel Pool expect western Europe's coal shortage to increase during the next 4 yr. In their annual investment survey, the coal and steel nations predict that between 1956 and 1960 western Europe will step up its coal production capacity by some 24 million tons. Yet increased uses of coal during the same period will mean a shortage of at least 14 million tons, very likely more. Last year, the six nations imported 13 million tons.

The 24 million tons of increased capacity, according to the investment survey, will be more than eaten up by increased demand for pig iron and for electrical power production. Some 16 million tons will go into expanded pig iron production while new electric power stations will require some 22 million tons. Thus, without allowing for increases in other demands, the deficit is set up at 14 million tons. The survey shows that the six countries sank $404 million into western Europe's coal industry—a drop from the $445 million invested in 1954. About 60% of this expenditure was made at the mines. This year's investment is slated to rise some $70 million over 1955 while estimates for 1957 are set at $457 million.

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Model 51-55 Dual

COAL DRILL

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"It's a life saver to us"

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Working ahead of an 8-yard loading shovel in 4-ft. coal, speed is essential.

Traction, hydraulic and electrical system operated by 109 hp engine. Push button controls. Drills can be operated singly or in tandem.

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Invulnerable

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SAFETY STEEL SHIELD*

Here, between tread and cord body, are thousands of cords of flexible steel. This Safety Shield is invulnerable to cuts and ruptures for original tread life *and* extra recap life!

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You are looking at a new kind of on-and-off-the-road truck tire. It is so *immune* to road hazards it runs over razor-sharp axblades without losing a pound of air. It has the deepest tread U. S. Royal has ever built into this type of tire. It is so *versatile* it outperforms on any wheel—gives greater stability on front wheels, increased traction on drive wheels, extra recaps on trailing wheels.

For dump trucks, transit mixers, log haulers . . . on any rig exposed to heavy impacts, tire-killing terrain. You'll enjoy fewer tire failures, less down-time expense, greater service dependability.

In sizes through 11.00. See your U. S. Royal Dealer . . . or write Truck Tire Department. You can specify "Super Fleetmaster" on your new equipment.

LOW SEAM MINES—Gain up to 500 extra tons per shuttle car per year with new U. S. Royal *Mine Cushion* tires. Savings start immediately. Inquire Industrial Tire Dept.

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puts safety first – where it counts the most!

Extensive research and development by R/M engineers to assure maximum safe operation with underground conveyor belts, now provides Fire Resistant belts in special constructions with Bureau of Mines' acceptance designation: "Fire Resistant, U.S.B.M. No. 28-10."

R/M's special Fire Resistant construction is available with all R/M brands of conveyor belt used underground, including Ray-Man . . . the belt *engineered* to outlast them all in coal mining operations! It has the *extra strength* and *flexibility* to handle the heaviest loads, even where small pulleys are required in low head room installations. Ray-Man is mildew-proof and moisture resistant. It resists gouging and tearing from large, abrasive lumps or accidental ripping . . . holds fasteners better than other constructions, even under the most severe operating conditions.

Users say Ray-Man Conveyor Belt gives them "More Use per Dollar" because it does a better job . . . and it lasts longer. Let an R/M representative show you how Ray-Man and other R/M feature conveyor belts with special Fire Resistant construction can put safety *first* on your job . . . give you "More Use per Dollar". RM 655

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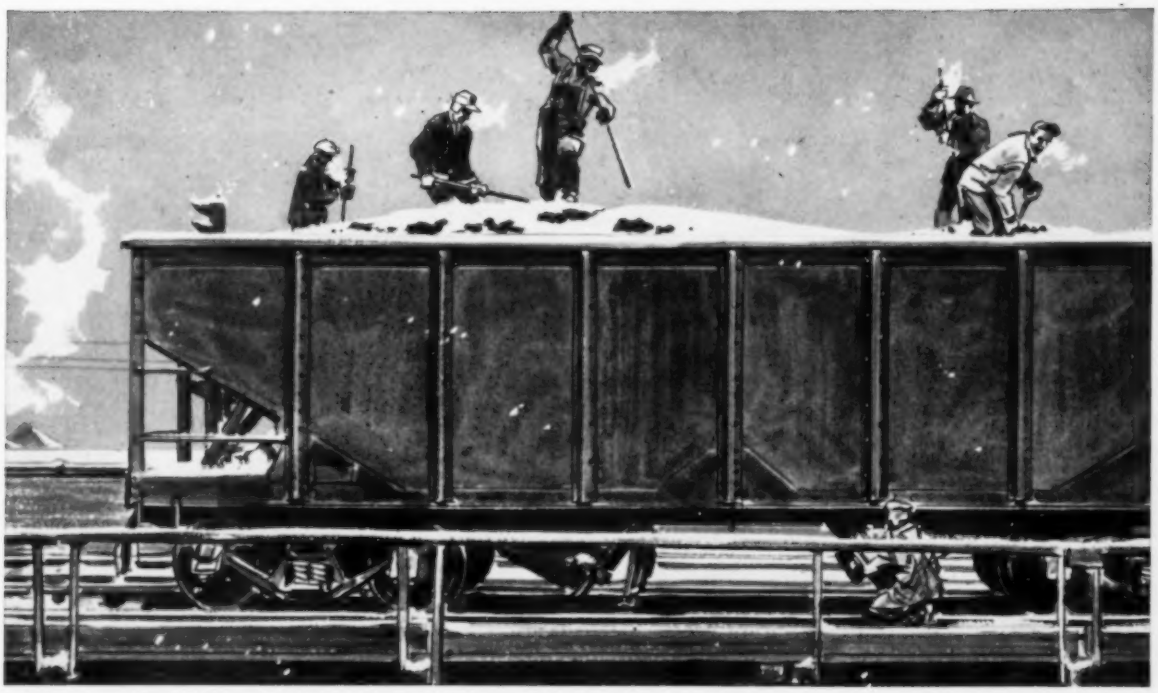

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• *Low cost of application* • *Scientifically treated to produce an ideal dissolving rate and minimize loss during initial draining* • *Will not lump in feeder* • *Contains a rust inhibitor to protect your equipment* • *Harmless to coal, harmless to hands and clothing* • *Can be used for conveyor equipment, switches, tracks, etc.* • *Readily available—comes in tough, 100-lb. bags.*

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Crandall Engineering Co., Inc., Birmingham, Ala.
Carbon Transfer & Supply Co., Helper, Utah
Carlsbad Supply Co., Carlsbad, New Mexico
McCombs Supply Co., Jellico, Tenn.
Union Supply Co., Denver, Colorado
Consolidated Supply Co., Picher, Okla.
W. B. Thompson Co., Iron Mountain, Mich.

★ ★ ★

Write for your copy of the CARMET MINING TOOL CATALOG

This informative 16-page booklet gives complete data, sizes, etc. on all styles of Carmet carbide-tipped cutter and drill bits. Also included is a valuable methods manual on reconditioning methods and equipment. Gladly sent free on request.

ADDRESS DEPT. CA-81

The unequalled range of selection that is available to you in Carmet carbide-tipped coal cutter and drill bits simply means this: that you can match up your bits just that much more closely with the actual conditions you have!

And *that* means you can profit by the greatest increase in cutting speed and tons cut per bit setting—the greatest reduction in down time and in over-all bit cost per ton—that is possible for you to secure *anywhere* with carbide bits. What's more, you have added assurance of top efficiency in the overlaying cap of steel that *double-bonds* the carbide tip of each Carmet cutter bit firmly in its seat. That's a feature which Carmet *originated*. It operates to protect you against tip loss, and to permit cutting on both sides as well as in front—eliminating side drag, reducing power consumption, etc.

Even the shank steel in Carmet carbide bits is a product of quality control: tough enough to insure against bending or breakage, yet of a hardness to permit set screw locking. ● Just *try* Carmet bits—see for yourself what they'll do! We'll be glad to cooperate with you in proving their advantages in your operation . . . see your distributor (left) about a test order. ***Allegheny Ludlum Steel Corporation, Carmet Division, Detroit 20, Mich.***

The Original ***DOUBLE-BONDED*** *Carbide Bit*

CARMET®

WSW 6190

new Bowdil TRIMMER CHAIN

FOR ALL MAKES CONTINUOUS BORING MACHINES

USES BOWDIL THROW-AWAY OR ½" x 1" SHANK BITS

CHAIN PITCH MAY BE VARIED BY CHANGING COUPLERS ONLY

NOTE THIS

COUPLING PIN DESIGN

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Great strength and flexibility. Highest grade steel "Fabri-Forged" to Bowdil standards of precision & performance.

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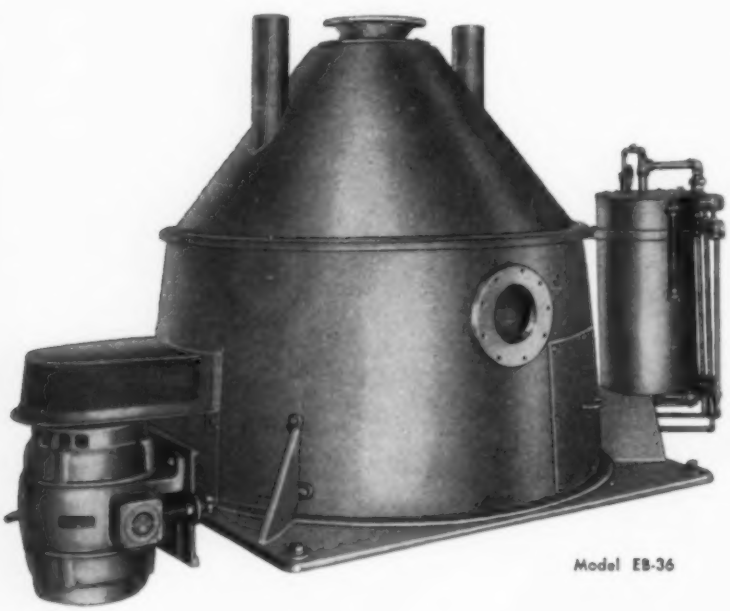
C·M·I

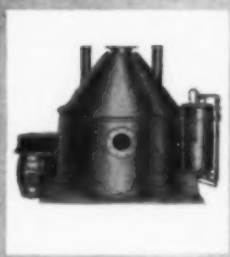
CONTINUOUS CENTRIFUGAL



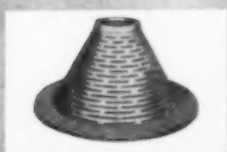
Model EB-36

Economy and efficiency are combined to make C·M·I Centrifugal Dryers leaders in their field. The unprecedented basket design of this dryer provides greater capacity together with economy of operation. The coal is dried to a 6% surface moisture content without the use of expensive heat-drying operations. Increased resistance to shock loads is provided by the new V-belt direct drive, while clogging, and resulting clean-out jobs, are nearly eliminated by an enlarged and improved discharge channel.

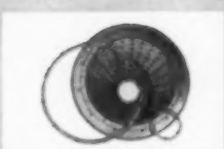
The new C·M·I dryer provides savings in daily operation expense in addition to low installation costs. For only a few cents a ton, this dryer will actually earn extra profits for you through the reclamation of marketable coal from slurry ponds. C·M·I welcomes the opportunity to assist you with your particular problems in this field.



Model EB-36 is compact, requires little space, little headroom.



The heart of Model EB-36 is the revolving basket and inner cone.



Metal clamping rings make it possible to replace worn out screens merely by loosening a few bolts — an exclusive feature.

Production capacity assures prompt delivery of new equipment and replacement parts at all times.

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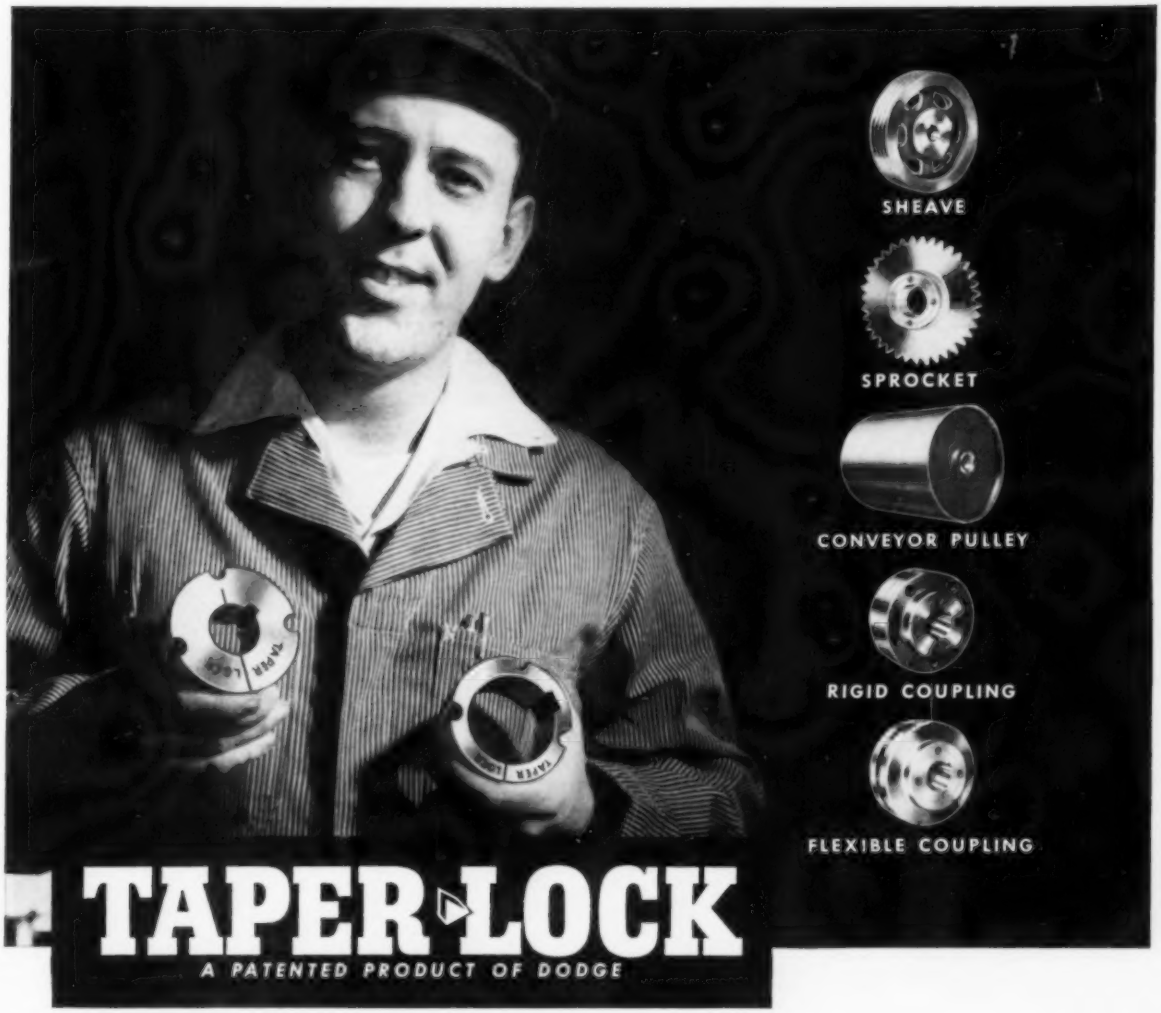
C·M·I Centrifugal DRYERS



"Brother...you sure can save with these interchangeable bushings!"

With a few Taper-Lock bushings you can make quicker changes and cut down-time on production machines—because Taper-Lock bushings are *interchangeable*. Shift from a Dodge sprocket to a Dodge sheave, and use the same bushing! Taper-Lock bushings are available in a range of sizes which makes changing from one size shaft to another equally easy and quick.

Mount 'em all with Taper-Lock bushings—your sheaves, sprockets, couplings, conveyor pulleys. They slip on the shaft quickly—hold with the firmness of a shrunk-on fit—come off easily without shock to bearings or machinery. Standardize, economize with Taper-Lock.

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THERE'S ONLY ONE TAPER-LOCK, THE BUSHING THAT MOUNTS FLUSH!

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable assistance on new, cost-saving methods. Look for his name under "Power Transmission Machinery" in your classified telephone directory, or write us.

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of Mishawaka, Ind.

3 ways to cut mining cable costs...

1. USE OKOCORD STANDARD CONSTRUCTIONS

Each Okocord construction has been designed to cut cable replacements on specific mining machines. Standard constructions for most of the important services are built from the conductor out to insure long life in the face of continual high speed reeling, rock-falls, frequent run-overs and constant dragging over mine floors and around corners. Here are four Okocord standard constructions.

Single Conductor—Reel cable made extra flexible and tough, Hex-Tite assembly to withstand re-reeling, rubbing and scraping.

Two-Conductor Round, Type G—Cable with two ground wires and two insulated conductors possesses maximum flexibility.

Three-Conductor Type W—Cable with three insulated conductors is available with heat-resistant insulations for either low or high voltages.

Twin Type G—Cable designed for maximum safety and reel capacity has center grounding wire and two insulated conductors.

2. USE OKONITE SPECIAL CONSTRUCTIONS

When you need a cable with unique specifications, consult with Okonite and avoid the costly troubles that often result from makeshift solutions. Special constructions are available for the newest mining equipment, including all types of continuous miners. Here are examples of the many Okocord special constructions that are manufactured to the same rigid specifications as standard constructions.

Three Conductor-Type PG—Special cable for d-c systems has uninsulated grounding wire which is approximately half the size of the two insulated conductors.

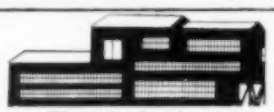
Four-Conductor Type PG—Special cable for d-c systems is similar to three-conductor type except with 3 insulated conductors.

Five-Conductor Type PCG—Special cable for "permissible" equipment features 1 uninsulated grounding, 2 insulated control and 2 insulated power conductors.

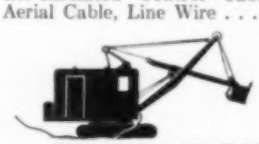
Six-Conductor Type PCG—Special cable for a-c systems is similar to five-conductor type except with 3 insulated conductors.

3. CONSULT WITH OKONITE ENGINEERS

The Okonite engineering staff is always ready to help you in the planning stage. Plant or mine power distribution, borehole or shaft cables, control systems, telephone circuits, conveyor controls . . . whatever your needs, Okonite will gladly help you select the safest and most economical cable for the job. Write or phone either our nearest district office or The Okonite Company, Dept. CA, Passaic, N. J.



. . . Watertite-Insulated Wire, Keystone-Insulated Wire, Okocord Flexible Cords, Watertite-Insulated Control Cable, Aerial Cable, Line Wire . . .



. . . Okocord Portable Cables Types W, G, SH-A, SH-B, SH-C, SH-D . . . Blasting Wire, Redshot Type RG, Type D Braided . . .

. . . Okocord Mine Drill and Control Cord, Okocord Type SO, Parkway, Okonite Mine Power Cable, Okocord Twin Type W . . .

. . . Continuous Mining Cable, Okocord Two-, Three-, Four-, Five-, and Six-Conductor Types G, W, PG, and PCG . . . Steel Armored, Self-Supporting . . .

where there's electrical power . . . there's **OKONITE CABLE**

4184-A

V-R MINER BITS

FOR EVERY APPLICATION

Last longer, save time and trouble . . . cost less to use

STYLE LN-1 MINER BIT for latest type miners—specially designed for solid mounting.

STYLE CM-3 BIT for Rotary Type Miners. Here is the answer to the problem of bit breakage in outside positions.

STYLE CA AUGER MINER BIT—specially engineered and designed for auger miners. Available in 1½" and 1¾" gauge lengths.

STYLE CM CONTINUOUS MINER BIT—improved flange design provides firmer support, prevents twist, resists breakage.

Combine a properly designed, heavy duty shank with the longest-lasting carbide available anywhere . . . and you have bits that wear and wear. That's what you get when you use V-R bits.

V-R manufactures its own carbides . . . has been a leader in the field since 1930. The carbide in V-R bits is an exclusive development providing exceptional resistance to abrasion and impact. Uniformity of product is assured by advanced quality control procedures from powder to finished product.

Buy the bits that are beating them all—V-R Bits.

ASK FOR LITERATURE—*call your V-R Representative or distributor, or write:*

Vascoloy-Ramet Corporation

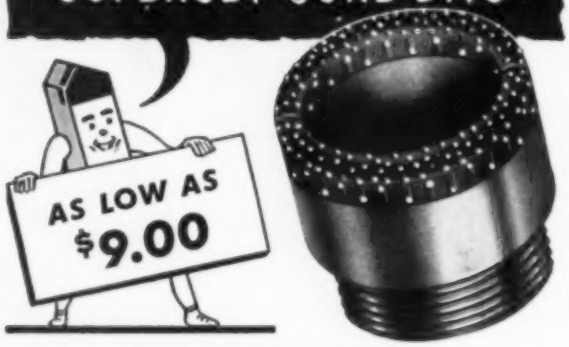
806 Market St. Waukegan, Illinois

SUBSIDIARY OF FANSTEEL METALLURGICAL CORPORATION

M-592

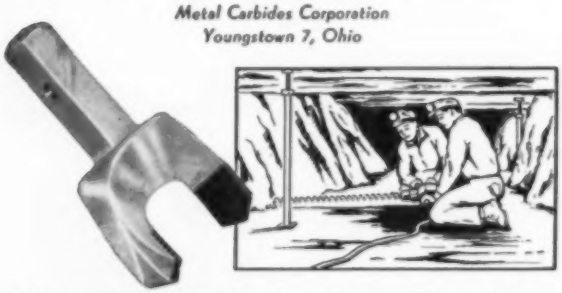
MANUFACTURERS OF CEMENTED CARBIDES • MINING TOOLS AND CUTTING TOOLS

SUPERSET CORE BITS



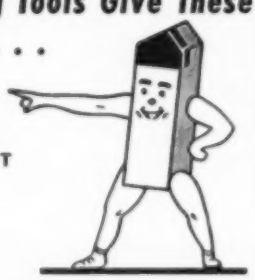
● Mining contractors, ore prospectors, coal operators and construction firms are realizing tremendous savings by taking advantage of our **exclusive fabrication service!** Contractors send us the necessary diamond stones from their own stocks—we hand set them in a super-hard tungsten carbide crown and braze to the threaded steel blank. Hand-set bits assure the proper positioning of each diamond stone to achieve maximum cutting efficiency. The carbide matrix holds the diamond stones until entirely used up. These advantages mean lower drilling costs to you. We can also supply complete core bits or salvage the stones from used bits at nominal cost. Supplied in standard sizes EX, EXE, AX, BX, NX, etc.

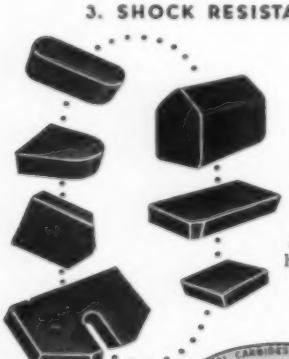
Metal Carbides Corporation
Youngstown 7, Ohio



Talide Tips for Mining Tools Give These 3 BIG ADVANTAGES . . .

1. EXTRA STRONG
2. SUPER HARD
3. SHOCK RESISTANT





● A complete line of low-cost, high-quality Talide Tips is offered fabricators and users for tipping machine bits, rock bits, drill bits, roof bits and open-pit bits. All Talide Tips have a special surface finish that facilitates brazing. Non-standard shapes and sizes quoted on request.

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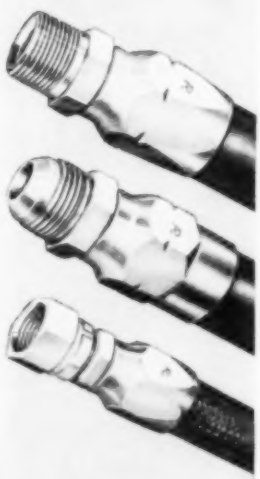
TALIDE
YOUNGSTOWN 7, OHIO
SINTERED CARBIDES · HOT PRESSED CARBIDES
HEAVY METAL · CERMETS · HIGH TEMPERATURE ALLOYS

New Parker Hoze-lok fittings make up easier, are re-usable

- Longer, trouble-free service. Because of unusually large gripping area, Hoze-lok won't pull out.
- Socket thread is larger than braid diameter, making it easier to insert hose end into socket. Socket contour provides greater wrench clearance at hex of nipple.
- Greater re-usability. You don't need big inventories.
- Conform both to S.A.E. Hydraulic Hose and Fitting Standard and to J.I.C. Hydraulic Standards.
- 3 styles available for medium and high-pressure service.
- Full details in Parker Catalog No. 4400.

Parker



Order From Your Parker Distributor — or Tube and Hose Fittings Division, Section 418-E, The Parker Appliance Co., 17325 Euclid Ave., Cleveland 12, Ohio.

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—anywhere

"We look into the Earth"

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No Matter What Your Job, You'll Find...

The COAL AGE Mining Guidebook and Buying Directory Issue is a useful, practical working manual

The largest, most complete single source of information on current mining practice available anywhere, the COAL AGE "Guidebook" will help you develop new ideas, a fresh slant on operating problems, the latest mining methods and equipment.

The 62-page Buying Directory lists for speedy reference all the known manufacturers of over 1,000 products used in coal mining, completely revised and up-dated for the 1956 edition. This comprehensive guide, along with the manufacturers' advertising and the Index to Advertisers' Sales Offices and Distributors, will help you quickly locate the nearest source of equipment, materials and services meeting your particular needs.

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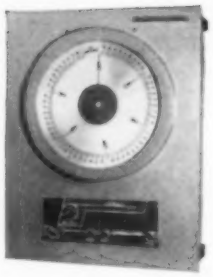
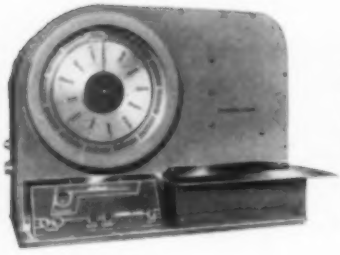
instrument translates electronic weight message for direct transmission to automatic typewriter or adding machine.





Model CR

desk indicator and weight printer can be located up to 250 feet from any Fairbanks-Morse electronic motor truck or track scale.

Remote reading

instrument for belt conveyor scale shows tonnage accumulated, percent capacity load and tons per hour.

The Fairbanks-Morse Floaxial

dial (with or without printer) is applicable to all mechanical F-M motor truck, track, mine car or weigh hopper scales.

However you weigh it

The Fairbanks-Morse way is the fast, convenient, accurate and economical method of measuring coal tonnage in production or distribution. There are Fairbanks-Morse electronic and mechanical scales for every coal weighing operation—and Fairbanks-Morse electronic scales for your belt conveyors.

The Fairbanks-Morse electronic systems offer the advantage of remote indication up to 250 feet—and they will feed the weight information directly into business machines like automatic typewriters, automatic adders or motorized tape punches. It is probable that your present lever scales can be converted to semi-electronic operation—for remote reading, recording and readout through Fairbanks-Morse electronic instrumentation. Write for informative new bulletin No. ED-16, or see your F-M scale expert. Fairbanks, Morse & Co., Dept. CA-9, 600 South Michigan Avenue, Chicago 5, Illinois.

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a name worth remembering when you want the BEST

SCALES • PUMPS • DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY • RAIL CARS • HOME WATER SERVICE EQUIPMENT • MOWERS • MAGNETOS

Cut Roof Bolting Costs!

with Dependable

PALNUT®

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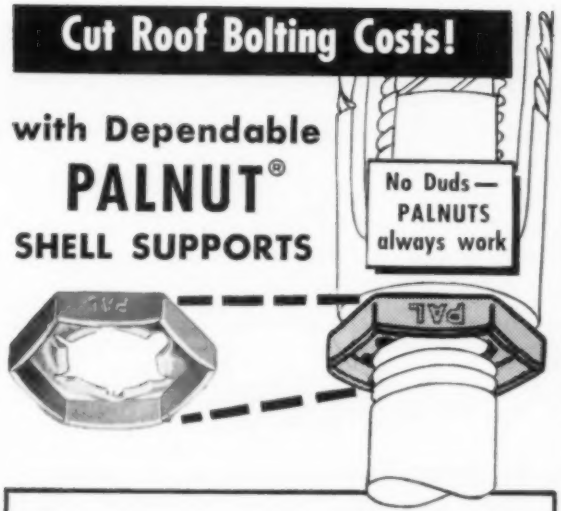


PALNUTS hold in softer types of strata where other shell supporting methods are often inadequate. Cuts costs by eliminating re-installation of bolts caused by shell support failure.

PALNUTS cost less than ½ as much as forged ears. Are easy and fast to assemble—offer worthwhile savings over other shell supports when plain bolt, PALNUT and standard type shell are assembled underground.

PALNUTS are also widely used on reclaimed bolts.

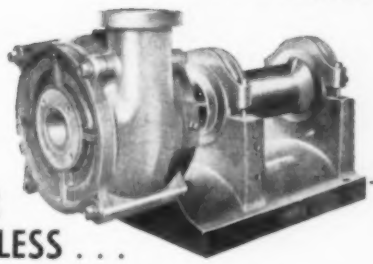
You can buy roof bolts with PALNUTS pre-assembled or buy PALNUTS separately from your jobber.

THE PALNUT CO. 31 Glen Road, Mountainside, N. J.

Subsidiary of United-Carr Fastener Corporation

LINATEX SAND PUMPS

DEFY ABRASION . . . CORROSION



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It has been proven that:
Linatex Sand Pumps will outwear any other sand pumps in the world.
All wearing parts are covered with long lasting, abrasion resistant LINATEX.
If you are responsible for an efficient pumping operation at your plant, write for further information on the LINATEX Pump.
Made in 10 standard sizes from 1 to 12 inches.
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The advertising rate is $10.20 per inch for Equipment and Business Opportunity advertising appearing on other than a contract basis. Contract rates quoted on request.

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Send New Advertisements or Inquiries to Classified Advertising Div. of Coal Age, P. O. Box 12, New York 36 for October issue closing Sept 19th

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DRILLS
CRANES—EUCLIDS

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618 Page Dragline, 110', 5 yd.
4-W Monighan Drag, 110', 4-½ yd.
1055 P&H Dragline, 100', 3 yd.
54-B Bucyrus Erie Drag, 90', 2-½ yd.
1201 Lima Dragline, 85', 3 yd.
3500 Manitowoc Drag, 80', 2-½ yd.
1001 Lima Drag, 80', 2-½ yd.
190-B Bucyrus Erie Elec. 8 yd. Shovel
170-B Bucyrus Erie Elec. 6-½ yd. Shovel
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2400 Lima 6 yd. Diesel Shovel
120-B Bucyrus Erie Elec. 5 yd. Shovel
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80-D Northwest 2-½ yd. Shovel
54-B Bucyrus Erie 2-½ yd. Shovel
38-B Bucyrus Erie 1-½ yd. Shovel
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EUCLID TRUCKS—Many to Choose From

FRANK SWABB EQUIPMENT CO., INC.
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PIPE 4", steel, heavy duty, 3,000 ft.; 100 ton railroad scales; Mining Machines, 312AA Goodman, 10B Sullivan; Mg Sets 200 & 75 KW; Railroad Hoist, 9,000 # line pull, 96 fpm; Conveyor, apron feeder 36" width, 80' centers; 3' x 6' Single deck Simplicity Screen.

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Large Electric Stripping Shovel, 20-35 cu. yd. capacity —State age, size, condition, price, location, when available—Principals only.

W2629 COAL AGE
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FOR SALE OR TRADE
One-Joy Continuous Miner

for sale or to trade for shuttle cars, cutting machines, loaders or other mining equipment. Specifications as follows:

#3JCM-28E Joy continuous miner, 250 volts D.C., U.S. Bureau of Mines permissible plate, approval #2-773, serial #JM-247, complete with #4-WS-2 Joy skid mounted high pressure water spray unit, 250 volts D.C., permissible plate, serial #WS-157, and including approx. $14,000 worth new spare parts for above continuous miner.

Above was purchased in 1950, but has been out of production for the past two years and is in excellent condition. Equipment may be inspected at your convenience. If interested in purchasing or making any trades for the above, please communicate with

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(C) 2—8BU As Is or Rebuilt, 250 Volt
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(C) 1—1224 Goodman Cutter, Rubber Mounted
(C) 1—685 Goodman Cat Mounted Loader
(C) 1—360 Goodman Loader

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(W) 1—52B 26" Jeffrey Conveyor, 900' center to center
(W) 2—95A 24" Goodman Conveyors, Approximately 300'
(C) 1—MTB 26" Joy Conveyor, 1000' centers, less belt
(W) 6—61AM Jeffrey Room Chain Conveyors
(W) 5—61HG Jeffrey Face Chain Conveyors
(W) 2—61EW Jeffrey Elevating Chain Conveyors
(W) 2—61W Jeffrey 15" gathering Chain Conveyors
(W) 4—15" Joy Chain Conveyors, Permissible
(W) 1—G15 Goodman Shaker Conv.
(W) 1—G12½ Goodman Shaker Conv.
(W) 1—PT12 Long Piggyback Conv.

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(W) 4—7AU Track Mtd. Sullivans
(W) 2—7B Sullivans, 220/440 V. AC
(W) 1—29C Jeffrey Arc Wall
(W) 1—29U Jeffrey, Track Mtd.
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(C) 2—412CA Goodmans
(W) 4—512DA Goodmans
(C) 2—712 Goodmans
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(W) 1—MH12 Jeffrey, 44", or 42" t.g.
(C) 1—MH110 Jeffrey, 42" t.g.
(W) 2—MH100 Jeffrey, 36" t.g.
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(W) 1—GE Battery Locomotive, 42" t.g. ... Locomotive & Batteries are new

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(W) 1—300KW Mercury Arc Rectifier, 275 V DC, 2300/4000 V. AC, completely automatic — Like New
(W) 2—200KW West. Rotary, 1200 RPM, 2300/4000 V. AC, 275 V. DC, Automatic Breakers
(W) 1—150KW HCC6, GE Rotary, 1200 RPM, 2300/4000 V. Automatic Breaker
(W) 1—150KW West. MG Set, 1200 RPM, 2200 V., 275 DC
(W) 1—150KW GE, MG Set, 1200 RPM, 2200 V., 275 DC
(C) 1—150KW West. MG Set, 2200 Volt.

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(W) 1—3 track, all steel tipple, located at Insull, Kentucky
(W) 6—Tons 4/0 & #1 Copper Wire
(W) 300—Tons 60# Relaying Rail.
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(C) 1—Nolan Automatic Car Spotter
(C&W) 12—Hoist—5 to 1000 H.P.
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(W) 1—MSA Bantam Duster
(C) 1—Track Mtd. High Pressure Duster
(W) 1—Sullivan Air Compressor
(W) 2—Crossover Dumps—New & Used
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(C) 1—42" Loading Boom
(C) 1—48" Loading Boom
(W) 1—Let 18" Belt Conveyor for 30' to 150'
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1—75 HP Vulcan Double Drum
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1—28A Jeffrey
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D.C.
3—7B Sullivan super shortwall
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3—8 ton Ironton, 36" ga.
2—8 ton General Electric, 36" ga.
2—8 ton Goodman, 36" ga.
1—10 ton Atlas, 36" ga.

TROLLEY LOCOMOTIVES
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2—8 T. Goodman, 42" ga.
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1—13 T. Jeffrey, 42" ga.
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2—Joy 12-BU Loaders, 7E, excellent.
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3—Joy 11-BU Loaders.
5—Goodman 660 Loaders on Cats, excellent.
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2—Joy 32E10 Shuttle Cars.
6—Joy 32E15 Shuttle Cars.
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1—Joy 7B Cutting Machine, excellent.
8—Goodman Machines on Cats, 31" high. All hydraulic.
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1—Goodman 512 Cutting Machine, perfect.
3—Jeffrey 29 UC Cutting Machines, cat mounted, perfect.

LOCOMOTIVES

2—Jeffrey 20 ton, type MH-110, 42" and 44" Ga.
4—Jeffrey 13 ton, type MH-110, 36", 42" and 44" Ga.
3—Jeffrey 10 ton, type MH-78, 42" and 48" Ga.
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1—G.E. 4 ton, type 825 Locomotive, 26" high.
10—G.E. 6 ton, types 801, 803, 821 Locomotives, 42", 44" and 48" Ga.
1—G.E. 8 ton, type 822 Locomotive, 44" Ga.
3—G.E. 10 ton, type 809 Locomotives, 42", 44" and 48" Ga.
1—G.E. 10 ton, 829 Locomotive, 36" Ga.
1—Goodman 4 ton, 8-30 Locomotive, 22" above rail.
8—Goodman type 33, 6 ton, 44" and 48" Ga.
2—Goodman 8 ton, type 32A, 44" and 48" Ga.
3—Westinghouse type 902, 4 ton, 42" and 48" Ga.
2—Westinghouse type 904, 6 ton, 44" and 48" Ga.
2—Westinghouse type 906, 44" and 48" Ga.
2—Westinghouse type 907, 10 ton, 44" and 48" Ga.

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1—Cedar Rapids portable super Screening Plant.
1—Railroad Car Unloading Conveyor, gas driven.
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1—4' x 10' Robbins Gyrex Vibrator.
1—4' x 14' Vibrator, three deck, low head.
Feeders, Drag Conveyors, and Loading Booms.

CUTTING MACHINES

3—Jeffrey 29UC Universal on cats.
4—Baby Goodman 212's, rebuilt.
3—Goodman 312's, 18" high.
2—Goodman 412's, 18" high.
2—Goodman 512's with Bugdusters, like new.
15—Goodman 12AA's and 12AA's.
10—Goodman 324 S'abbers.
2—Goodman 724 Slabbers.
30—Jeffrey 35L, like new, 17" high.
15—Jeffrey 35B's and 35BB's.
2—Jeffrey 29B's on track.
1—Jeffrey 29L, track mounted.
2—Jeffrey 29C's, track mounted.
1—Jeffrey 29U, Universal, track mounted.
2—Sullivan CR-10, 15" high.

LOADING MACHINES

17—Joy Loaders, all types.
2—Jeffrey 61 CLR's on rubber, 26".
3—Jeffrey L-500 Loaders.
2—Goodman 360 Loaders.
3—Myers Whaley No. 3 Automat Loaders.
3—Clarkson Loaders, 26" above rail.

CONVEYORS

2—Joy 30" Belt Conveyors, 10 to 15 H.P.
2—Goodman 97-C's, 26"
3000' 30" Conveyor Belt.
8—Jeffrey 61 AM Room Conveyors, 300 ft.
10—Jeffrey 61 HG Face Conveyors.
5—Room Conveyors, type 400, 300 ft.
2—61EW Elevating Conveyors.
2—61 WH, 15" Room Conveyors, 300 ft.
4—Joy Ladel UN-17 Shakers.
10—Goodman G-12½ and G-15 Shakers.

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3—300KW, G.E. HCC-6 Rotary Converters, 275 DC.
1—200KW Westinghouse Rotary Converter, 275 DC.
1—300KW Westinghouse Rotary Converter, 275 DC.
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2—150KW MG Sets, G.E. and Westinghouse.
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1—300KW MG Set, General Electric.
1—500KW MG Set, General Electric.
1—Cummins 125 KW, 250 volt DC.
1—700 H.P. Shaft Hoist, complete.
Complete steam plant, will sell all or any part.
Boilers, like new, 1100 H.P. & 500 H.P. Also transformers, Turbines, etc.
Complete Tipples with Cleaning Plants.

MISCELLANEOUS

10—Air Compressors, 1 H.P. to 50 H.P.
40 Mine Pumps, all types.
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150 Mine Cars, 18" high, end dump, 44" Ga.
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1—12 ton Differential Slate Larry.
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Incline Hoists, 25 to 50 H.P.
Machine tools for mine shops.
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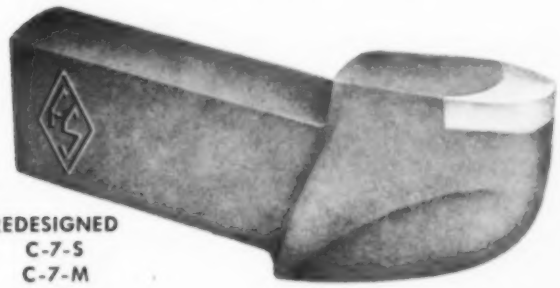

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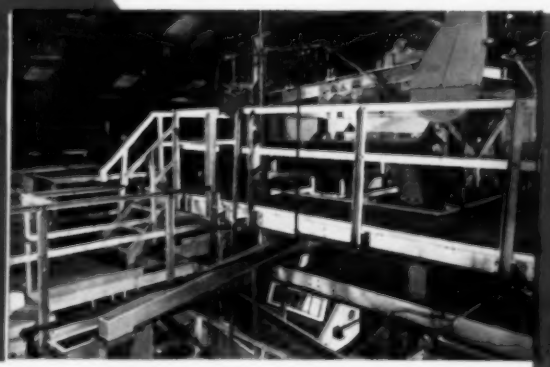

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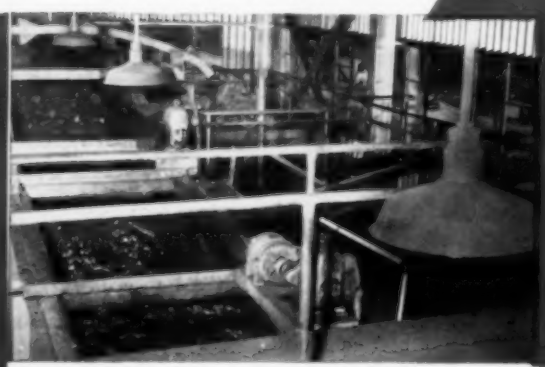

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